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Tongass National Forest

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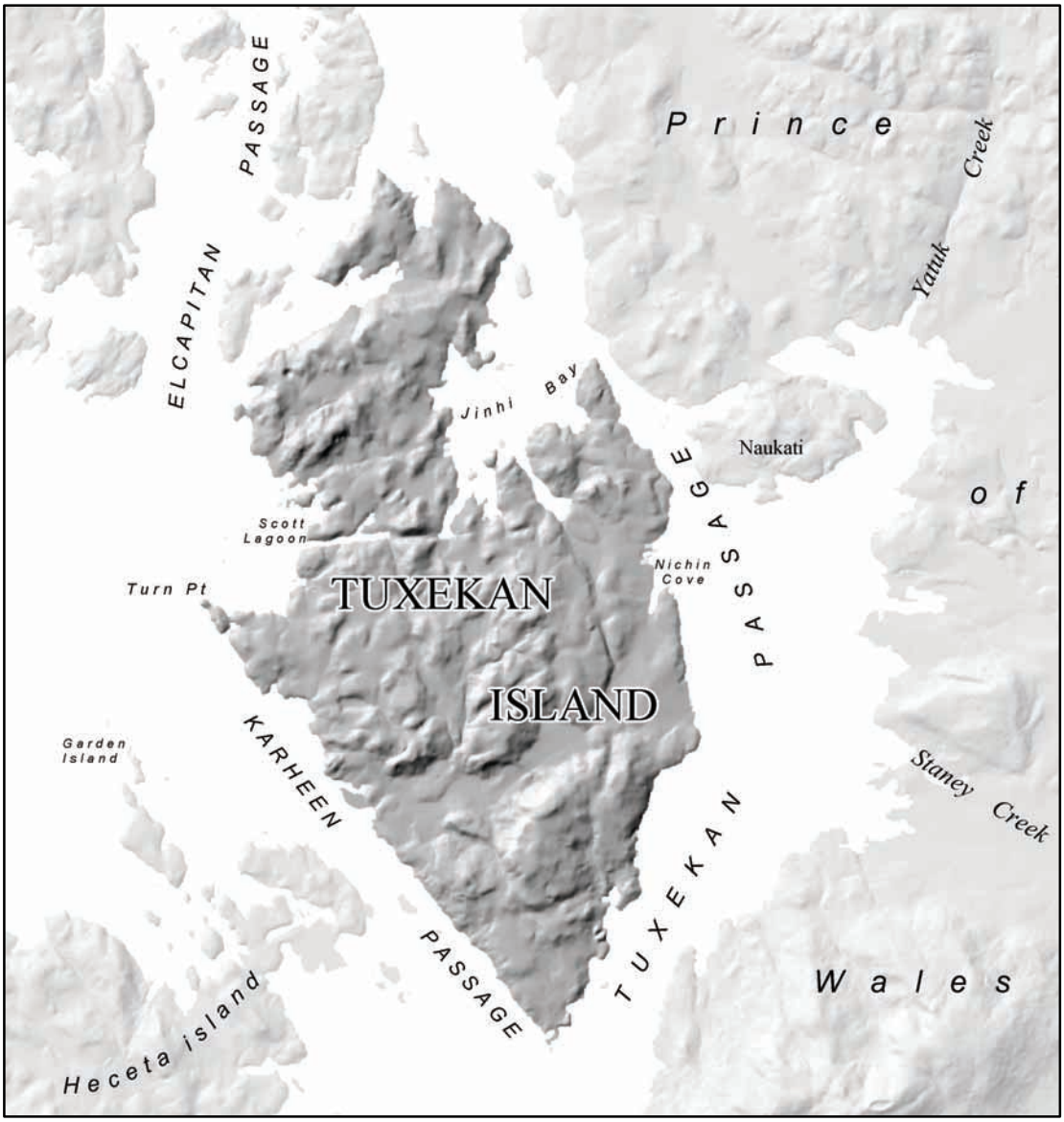
Tuxekan Island Timber Sale Volume A - Record of Decision



United States Department of Agriculture **Forest Service** **Alaska Region** **Tongass National Forest**

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File Code: 1950-3
Date: October 3, 2006

Dear Planning Participant:

Enclosed is your copy of the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Tuxekan Island Timber Sale Project on the Thorne Bay Ranger District, Tongass National Forest.

The FEIS describes one no-action alternative and four action alternatives for timber harvest in the Tuxekan Project Area. Alternative 5 was developed in response to your comments on the Draft EIS. Responses to your comments can be found in the FEIS. The ROD explains my decision to select Alternative 5, and the factors considered in reaching my decision.

Information concerning implementation of this decision and appeal rights are included in the ROD. New regulations (36 CFR 215) regarding appeals of NEPA decisions became effective June 4, 2003 and contain new requirements related to appeal eligibility and appeal filing requirements.

Copies of the FEIS and ROD have been mailed to those who requested to remain on the mailing list for this project. Additional copies are available at the Thorne Bay Ranger District, P.O. Box 19001, Thorne Bay, Alaska, 99919, or by calling 907-828-3304.

I want to thank everyone who took time to review and submit comments on the Draft EIS and those who participated in the Subsistence Hearings. Your comments and involvement throughout this project have been important to me, and I appreciate your continued interest in the management of the Tongass National Forest.

Sincerely,

FORREST COLE
Forest Supervisor

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Tuxekan Island Timber Sale FEIS and ROD

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Record of Decision
Tuxekan Island
Timber Sale Project

Background

The 17,730-acre Tuxekan Island Timber Sale Project Area encompasses all of Tuxekan Island in townships 69 and 70 east (T69E, T70E) and ranges 78 and 79 south, (R78S, R79S), Copper River Meridian.

Purpose of and Need for the Project

The purpose of and need for the Tuxekan Project is to move the project area towards the Forest Plan desired condition using timber harvesting to achieve Forest-wide goals and objectives and project-specific land use designation goals, objectives, and desired conditions. Applicable Forest-wide goals and objectives are found in the Forest Plan, pp. 2-3 and 2-4. The land use designation is specific to the Tuxekan Project are Timber Production and Old-growth Habitat.

Changes Between the Draft and Final Environmental Impact Statement (DEIS)

Changes have been made between the Draft and Final EIS reflecting additional analysis in consideration of public comments and additional fieldwork. The numbers for the Final Environmental Impact Statement were rerun using current data and the suitability process as outlined in the suitability runs for the SEIS (2003). Alternative 5 was developed to address concerns raised by public comment on the DEIS. Please see the description and analysis of Alternative 5 in Chapters 2 and 3 of the Tuxekan Island Timber Sale Project FEIS.

In June of 2005, Forest Service personnel conducted additional field surveys of karst features (Baichtal, 2005, pers. com.) and proposed road locations (Emley, 2005, pers. comm.). As a result, a number of the proposed road locations were changed to avoid areas of high vulnerability karst in all action alternatives. See *Appendix 1* (Unit Cards), and *Appendix 2* (Road Cards) to view the updated National Forest System (NFS) and temporary road locations. The road relocations caused an increase in NFS road of 0.7 – 1.0 miles (depending on alternative) and a decrease in the amount of temporary road of 0.6 – 1.0 miles (Table 2). The Tuxekan Access Management Plan (*FEIS, Appendix F*) was updated to be consistent with the draft Prince of Wales Access and Travel Management plan. Due to the update, an additional 1.7 miles of road will be put into storage (Maintenance Level 1), and the open road density after project implementation

will be reduced to 0.8 miles of road per square mile (*FEIS, Chapter 3, Transportation Management, Table 3-71*, p. 3-136).

Table 1. NFS Road Location Modifications Between DEIS and FEIS

Road Number	Included in Alternative	Miles of Road		
		DEIS Location	FEIS Location	Total Change in Individual Road Miles
1460015	**2, 3, 4, 5**	0.2	0.2	**0.0**
1460900	**2, 3, 4, 5**	0.2	0.2	**0.0**
1470000	**2, 3, 4, 5**	1.1	1.8	**+0.7**
1470131	**2, 3, 4, 5**	0.2	0.2	**0.0**
1470320	**3, 4, 5**	0.6	0.9	**+ 0.3**
1470330	**3, 5**	0.4	0.4	**0.0**

Table 2. Proposed NFS Road Location Modifications and Total Proposed NFS Road by Alternative

	Alternative			
	Alt 2	**Alt 3**	**Alt 4**	**Alt5**
Total change in proposed new NFS road miles between the DEIS and FEIS	+0.7	+1.0	+1.0	NA
Total NFS Road miles proposed by Alt. (FEIS)	3.1	4.7	3.9	4.3
Total change in proposed new Temp road miles between the DEIS and FEIS	-0.6	-1.0	-0.7	NA
Total Temp road miles proposed by Alt. (FEIS)	3.1	4.9	2.1	4.5
Miles of Road proposed on High vulnerability Karst in DEIS	0.2	0.29	0.25	NA
Miles of Road proposed on High vulnerability Karst in FEIS	0.0	0.0	0.0	0.0

Based on the 2001 Roads Rule definitions, only approximately 2.0 miles of the initial 31 miles of road identified as reconstruction in the DEIS are actually in need of reconstruction (Alternatives 3 and 5). The remaining approximately 29 miles require normal maintenance and repair. A portion of the project area roads have undergone maintenance since the DEIS was completed. The road maintenance on Tuxekan Island that was scheduled in 2004 and performed in 2004 and 2005 was done to maintain environmental compliance and ensure continued administrative access. The remaining road maintenance would be conducted prior to project implementation. This maintenance improves road conditions within the project area. The Road Cards have been updated to reflect these changes.

Development of Alternative 5 (Selected Alternative)

Following the review of public comments received on the DEIS, the interdisciplinary team developed an additional alternative (*FEIS, Chapter 2,* p. 2-22 and 2-23). Alternative 5 was developed to most closely meet the purpose and need identified for the project while addressing the significant issues (see below).

Decision

Based on the analysis in the Final Environmental Impact Statement and the associated planning record for the Tuxekan Project, I have decided to implement Alternative 5 and to amend the Tongass Land and Resource Management Plan with a non-significant amendment to adjust small old-growth habitat reserves in Value Comparison Units (VCU) 556, 557, 560 and 587.2. This alternative best moves the area towards the Forest Plan desired vegetation conditions (*FEIS, Chapter 1, Purpose and Need,* pp. 1-15 and 1-16*),* while striking a balance among issues of:

- Watershed health and karst system protection,
- Timber sale and local economics, and
- Wildlife concerns, i.e., size and composition of the old growth reserves, connectivity between small old-growth reserves and maintenance of high value deer habitat.

Alternative 5 includes timber harvesting on approximately 523 acres that will produce an estimated harvest volume of 18.3 million board feet (MMBF). This Record of Decision documents the specific components of and the rationale for my decision. A non-significant Forest Plan Amendment is required for implementation of Alternative 5, which adjusts small old-growth reserves (small OGRs) in value comparison units 556, 557, 560 and 587.2 to meet Forest Plan requirements.

The access to unit 587.2-412, the temporary access road from NFS 1460030, has been eliminated in favor of a temporary road from NFS 1460000. This new temporary location is shorter than the original temporary location and eliminates the need for 0.5 miles of maintenance on NFS 1460030. See *Appendix 1, Alternative 5: Unit 587.2412,* p. A1-103

For a more detailed description of Alternative 5 see the *Tuxekan Island Timber Sale Project FEIS, Chapter 2, Alternative 5,* pp. 2-22 to 2-27. Additional information is included in the following attachments: ROD Unit Cards (*Appendix 1*) and ROD Road Cards (*Appendix 2*), ROD Map (*Appendix 3*), and Non-significant Forest Plan Amendment (*Appendix 4*).

Under this alternative, I will implement this decision using Forest Plan Standards and Guidelines for marten and goshawk as clarified in the Tongass Forest Plan Implementation Clarification document (TPIT) and Tongass Forest Plan Maintenance Program, Concern Paper 04-3 (http://www.tongass-

fpmaintprog.net/concerns/concerns.php). Any changes occurring as a result of this implementation, will be addressed through the Change Analysis process discussed later in this document.

The following actions, shown in Table 3, comprise the major elements of my decision. Appendix 4, attached to this Record of Decision displays the rationale for the non-significant Forest Plan amendment.

Table 3. Management Activities and Outcomes Associated with Alternative 5

Management Activity			Alt 5
Summary	Planned unit acreage including unit acres deferred or reserved from harvest		1,131
	Number of units		32
Timber Management	Harvest method	Clearcut with reserves (acres) Two-aged management	444
		Single tree selection (acres) Uneven-aged management	79
		Total of all methods (acres)	**523**
		Deferred or reserved from harvest (unit acres)	608
	Harvest system	Running skyline (acres)	297
		Small slackline (acres)	73
		Shovel (acres)	38
		Helicopter (acres)	115
		Yarding corridors through unsuitable land (slopes >72 percent) (acres)	0.9
Output	Potential harvest volume (MMBF)		18.3
Small Old-growth Reserves (Small OGRs) See ROD Appendix 4 - Non–Significant Forest Plan Amendment			Fully implements the interagency committee's recommended boundary changes to all four small OGRs in the project area
Road Work	Construction	NFS road (miles)	4.3
		Temporary road (miles)	4.5
	Reconstruction (miles)		2.0
Economics	Total CCF		36,656
	Total MBF		18,328
	Expected bid value ($/ CCF)		$12.87
	Expected bid value total ($)		$471,826
	Road cost / CCF		$30.92
	Logging cost / CCF		$135.28
Employment	Number of jobs	Sawmills	72
		Logging (includes road construction)	45
	Total Employment		117
	Direct income		$4,333,073

Reasons for the Decision

In reaching my decision, I have considered the Purpose and Need for action, the environmental effects of each alternative, public comments and issues, and social and economic needs of the local communities. The key factors in my decision focused on:

- How well an alternative moved the Tuxekan area toward desired vegetative conditions (*FEIS, Purpose and Need, Chapter 1*, pp. 1-11 and 1-16)
  - Manage the timber resource for production of sawtimber and other wood products from suitable timber lands made available for timber harvest on an even-flow, long-term, sustained-yield basis and in an economically efficient manner.
  - Seek to provide a timber supply sufficient to meet the annual market demand for Tongass timber and the market demand for the planning cycle.
  - Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska.
  - Support a wide range of natural resource employment opportunities within Southeast Alaska's communities.
  - Maintain a Forest-wide system of old-growth forest habitat to sustain old-growth-associated species and resources and ensure that the reserve system meets the minimum size, spacing, and composition criteria.
- How well an alternative addressed the issues (*FEIS, Issues, Chapter 1*, pp. 1-20 to 1-22)
  - Reducing environmental effects to soils, hydrology, and karst resources (*FEIS, Chapter 3, Issue 1, Soil* pp. 3-2 to 3-15, *Hydrology* pp. 3-15 to 3-45, *Karst* pp. 3-45 to 3-65),
  - Providing jobs and income to benefit local residents and a positive economic return to timber sale purchasers (*FEIS, Chapter 3, Issue 3, Deer Habitat and Subsistence Use* pp. 3-99 *to* 3-105, *Lifestyles and Community Stability* pp. 3-257 *to* 3-258*; FEIS, Issue 2, Timber Sale and local Economics* pp. 3-65 to 3-75),
  - Meeting Forest Plan small old-growth reserve (Small OGR) guidelines and maintaining connectivity between small old-growth reserves (*FEIS, Chapter 3, Issue 3, Biodiversity* pp. 3-78 to 3-105*; ROD Appendix 4*). Although connectivity between small OGRs is not a Forest Plan requirement, it was a significant issue raised by the public during the public comment period. Commenters stated that travel corridors between small wildlife reserves on the island should be maintained. In addition, the interdisciplinary team recognized it as an issue because of past harvest in riparian and beach buffers; features

that the Forest Plan recognized as providing connectivity between OGRs.

Alternative 5 was designed to address karst, watershed, and wildlife concerns while maintaining as much harvest volume as possible. This alternative was not designed to maximize economic return (*FEIS, Chapter 2, Alternative 5*, pp. 2-22 to 2-27). Based on these objectives, Alternative 5 provides the best balance between meeting the Purpose and Need for the project and satisfying the significant issues raised by the public with the Proposed Action (*FEIS Chapter 2, Comparison of Alternatives* pp. 2-29 to 2-46).

Addressing the Purpose and Need

Alternative 5 meets the purpose and need for this project by:

1. Managing the timber resource for production of sawtimber and other wood products (18.3 MMBF) from suitable timber lands made available for timber harvest (*FEIS, Chapter 3, Other Resources, Vegetation Management*, pp. 3-137 to 3-158) on an even-flow, long-term, sustained-yield basis and in an economically efficient manner (*FEIS, Chapter 3, Issue 2, Timber Sale and Local Economics* pp. 3-65 to 3-76 *and Chapter 3, Socioeconomics* pp. 3-252 to 3-263).
2. Providing a timber supply that contributes to meeting the annual market demand for Tongass timber (18.3 MMBF) and the market demand for the planning cycle (*FEIS, Chapter 3, Issue 2, Timber Sale and Local Economics* pp. 3-65 to 3-76 *and Chapter 3, Socioeconomics, Income and Employment pp.* 3-260 to 3-261).
3. Providing a diversity of opportunities for resource uses that contribute to the local and regional economies (117 jobs; $4,333,073 direct income) of Southeast Alaska (*FEIS, Chapter 3: Issue 2, Contributions to Local Employment* pp. 3-73 to 3-74*; Deer Habitat and Subsistence Use* pp. 3-99 to 3-105*; and Lifestyles and Community Stability* p. 3-258).
4. Supporting employment opportunities (117 jobs) within Southeast Alaska's communities (*FEIS, Chapter 3: Issue 2, Contributions to Local Employment* pp. 3-73 to 3-74 *and Lifestyles and Community Stability* p. 3-258).
5. Adopting the Interagency Committee recommendation for small OGRs, thus contributing to the Forest-wide system of old-growth forest habitat to sustain old-growth-associated species and resources and ensure that the reserve system meets the size, spacing, and composition criteria (*FEIS, Chapter 3, Issue 3a* pp. 3-78 to 3-105*; ROD Appendix 4*). Fully implements the Interagency Committee recommended boundary changes to all four small OGRs in the project area.

Addressing the Issues

Issue 1 - Watershed Health and Karst System Protection

Ground disturbance due to timber harvesting and road building will result in increased cumulative effects to soils, hydrology, and karst features and systems within Tuxekan project area watersheds. (*FEIS: Chapter 1, Issue 1 - Watershed Health and Karst System Protection*, pp. 1-20 to 1-21*; Chapter 2, Comparison of Alternatives by Significant Issue, Table 2-3: Issue 1,* pp. 2-33& 2-34; *and Chapter 3, Issue 1 - Watershed Health and Karst System Protection,* pp. 3-1 to 3-65).

Relocation of roads in all alternatives, including Alternative 5, eliminated impacts to high vulnerability karst, because no roads will be built on high vulnerability karst.

Alternative 5 reduces the proposed NFS road construction by approximately 12.5 percent compared to the road construction proposed in Alternative 3 (Modified Proposed Action). Alternative 5 reduces impacts to soils, hydrology, and karst features and systems by modifying the harvest methods of and access to some units (increasing helicopter logging).The DEIS proposed access to unit 587.2-412, the temporary road off NFS 1460030, has been eliminated in favor of a temporary road off NFS 1460000. This new temporary location is shorter than the original temporary location and eliminates the need for 0.5 miles of maintenance on NFS 1460030. See Issue 2 below. However, I believe Alternative 5 best balances the need to protect resources while maximizing outputs and economic return.

Issue 2 - Timber Sale and Local Economics

The proposed project may not provide jobs and income benefiting local residents or provide a positive economic return to timber sale purchasers. (*FEIS: Chapter 1, Issue 2 - Timber Sale and Local Economics,* p. 1-21; *Chapter 2, Comparison of Alternatives by Significant Issue, Table 2-3: Issue 2,* p. 2-35; *and Chapter 3, Issue 2: Timber Sale and Local Economics,* pp. 3-65 to 3-76)

Although the Selected Alternative has a 91 percent potential harvest volume compared to Alternative 3, the Selected Alternative ranks third in expected bid value ($/CCF) and has the second highest road and logging costs of all alternatives (*ROD Table 4 FEIS, Chapter 2, Table 2-3: Issue 2,* p. 2-35).

Alternative 2 has the highest expected bid value ($/CCF) of all alternatives. The two factors that contribute most to the difference in expected bid prices between the Selected Alternative and Alternative 2 are road and logging costs per CCF. Alternative 2 has a road construction cost per CCF of $25.53 and Alternative 5 has a cost of $30.92/CCF. Alternative 2 has an average of 5,031 CCF per mile of road construction vs. 4,213 CCF per mile in Alternative 5. The higher CCF/mile of road construction ratio in Alternative 2 improves the economics. Alternative 2 has less specified and temporary road construction than Alternative 5 (6.2 miles vs. 8.8 miles). It also has less reconstruction than Alternative 5 (0.0 miles vs. 2.0 miles). The total difference in road construction, reconstruction, and maintenance

costs between the two alternatives is approximately $362,000. The stump-to-truck cost in Alternative 2 is $72.95 and $77.05 in Alternative 5. The total logging cost per CCF in Alternative 2 is $126.03 per CCF vs. $135.28 in Alternative 5 for a difference of $9.25 per CCF. The higher logging cost per CCF in Alternative 5 is due to the higher percentage of helicopter yarding, 115 acres vs. 82 acres in Alternative 2. The total helicopter yarding cost in Alternative 2 is $918,559 and it is $1,353,845 in Alternative 5 for a difference of $435,286. All of these factors contribute to the difference in the expected bid price per CCF of $7.63. Refer to the *FEIS, Chapter 3, Issue 2, Timber sale and local economics,* pp. 3-65 to 3-76.

While Alternative 5 does not maximize the economic return that would be realized by Alternative 3, I believe that Alternative 5 strikes the best balance between maximizing economic return and protecting resources.

Issue 3 – Wildlife

3a. *The small old-growth reserves as originally mapped do not meet Forest Plan minimum requirements. There is concern that because of past harvest on the island, habitat connectivity between small OGRs would be further compromised. (FEIS Chapter 1, Issue 3 – Wildlife, Issue 3a,* pp, 1-21 & 1-22*; Chapter 2, Comparison of Alternatives by Significant Issue, Table 2-3: Issue 3a,* p. 2-35; *and Chapter 3, Issue 3 – Wildlife, Biodiversity,* pp 3-76 to 3-100*).*

Alternative 5 responds to Issue 3a by:

- Adopting the Interagency Committee recommendations for modifications to the existing small OGRs (*ROD Appendix 4*);
- Emphasizing old growth connectivity in the interior of the island including designation of 3,942 acres of small OGRs as listed in the "Old-growth Habitat Reserve Review" for Thorne Bay and Craig Ranger Districts, Tongass National Forest, May 2002 (USDA 2002).
- Maintaining connectivity while maximizing timber harvest units and reducing impacts to karst by making adjustments for road locations and harvest methods.

3b. *Proposed harvest in the project area would reduce high value deer habitat adversely impacting subsistence users.* (*FEIS Chapter 1, Issue 3 – Wildlife, Issue 3b,* pp, 1-22; *Chapter 2, Comparison of Alternatives by Significant Issue, Table 2-3: Issue 3b,* p. 2-36; *and Chapter 3, Issue 3 – Wildlife, Deer Habitat and Subsistence Use,* pp 3-99 to 3-122*)*

Alternative 5 responds to Issue 3b by:

- Maintaining about 50 acres more of high value deer habitat than Alternative 3.
- Maintaining about 50 acres more of productive old growth (POG) than Alternative 3.

While there is little difference in the total acres allocated to small OGRs between Alternatives 3 and 5, the Alternative 5 configuration of small OGRs follows the

recommendations listed in the "Old-growth Habitat Reserve Review" for Thorne Bay and Craig Ranger Districts, Tongass National Forest, May 2002.

Alternative 5 dropped unit 560-406, which addressed the public's concerns over connectivity between small OGRs. However, dropping this unit increased the road and logging costs for the entire alternative, which, in turn, decreases the expected bid value for Alternative 5. See Issue 2 above.

Alternative 5 implements the Interagency Committee recommendations for small OGRs, increases the amount of coarse-structured stands protected in small OGRs, and harvests approximately one percent less (47 acres) high-value habitat and volume class 6 and 7 stands than Alternative 3 – Modified Proposed Action.

Based on these factors, I believe Alternative 5 best moves the area towards the Forest Plan desired vegetation conditions (*FEIS, Chapter 1, Purpose and Need,* pp. 1-15 & 1-16; *ROD, Appendix 4*) while striking a balance with the issues of wildlife concerns.

Environmental Protection Agency (EPA) Recommendations

During the public comment period, the EPA recommended, "selection of a modified version of Alternative 4 that would eliminate areas from timber harvest that would require construction of new roads on high vulnerability karst formations." Relocation of roads in all alternatives eliminated impacts to high vulnerability karst. See *Issue 1* section, above, and *Other Alternatives Considered*, *High Vulnerability Karst*, below.

Public Involvement

As described in the background, the need for this action arose in Tongass National Forest 10-Year Timber Sale Action Plan in 1999. This project has been listed on the Tongass National Forest Schedule of Proposed Actions since 1999. Both of these documents are available on the Internet. Project announcements were printed in the Ketchikan Daily News on April 4, 2000, and in the Island News on April 10, 2000.

A Notice of Intent (NOI) was published in the Federal Register on April 3, 2000, to announce that an environmental impact statement would be undertaken for the project.

The proposal was provided to approximately 139 individuals, groups, federal and state agencies, Alaska Native groups, municipal offices, and businesses for comment during scoping (April 2000). This mailing list was comprised of those who had previously shown interest in USDA Forest Service projects in Southeast Alaska. The Forest Service received sixteen (16) responses to this mailing.

Public meetings for the project were held in Klawock (April 4, 2000), Thorne Bay (April 6, 2000), Naukati (April 9, 2000), and Edna Bay (April 10, 2000). These meetings provided project area information, presented the proposed project, and discussed local concerns and interests that concerning the project analysis.

Phone conversations with 18 knowledgeable subsistence users, representing six communities located on northern Prince of Wales Island, Cleveland Peninsula, and Kosciusko Island were used to confirm and update information regarding subsistence activity obtained from specific communities in the region (URS 2002h). Notice of formal subsistence meetings was sent in July 2005 to several agencies, advisory committees, and tribes. These meetings were held in Naukati on August 22 and in Craig/Klawock on August 23, 2005. No publics attended either meeting. A Tlingit tribal elder from Klawock telephoned on August 22 to express concern for tribal cultural resources and traditional cultural properties on Tuxekan Island. The elder's concerns have been addressed through tribal consultation and cultural resource protection measures which are discussed elsewhere in this document (*Government to Government Consultation with Tribes; Executive Order 13007 - "Indian Sacred Sites" (1996)*).

Full results and evaluation of comments from these public involvement efforts can be found in the project planning record. A summary of public scoping can be found in Chapter 1 (*FEIS, Chapter 1, Public Involvement,* pp. 1-16 to 1-19). Using the comments from the public, the interdisciplinary team identified several issues regarding the effects of the proposed action (*FEIS: Chapter 1,Issues,* pp. 1-19 to 1-22). The main issues were:

1. Ground disturbance due to timber harvest and road building will result in increased cumulative effects to soils, hydrology, and karst features and systems within Tuxekan Project Area watersheds.
2. The proposed project may not provide jobs and income benefiting local residents or provide a positive economic return to potential bidders.
3. The small old growth reserves as originally mapped do not meet Forest Plan minimum requirements. There is concern that because of past harvest on the island habitat connectivity between small old growth reserves would be further compromised (not a Forest Plan requirement, but a significant public issue).

To address these issues, the Forest Service created Alternatives 2 and 4. Chapter 2 provides detailed descriptions of the alternatives that were formulated from comments received during public scoping.

I have reviewed the comments received following the public comment period for the DEIS. I directed the IDT to include these comments in the analysis for this Final Environmental Impact Statement (FEIS). The FEIS has been modified to incorporate those comments, including the development of Alternative 5. Responses to all comments received are included in Appendix H of the FEIS.

Consultation with Agencies, Communities, Native Groups, and Others

The following state and federal agencies and federally recognized tribal governments were consulted about this project:

- Alaska Department of Fish and Game (ADF&G)
- Alaska Department of Environmental Conservation (ADEC)
- Alaska Division of Governmental Coordination (ADGC)(Currently this agency is part of the AK DNR)
- U.S. Environmental Protection Agency (EPA)
- U.S. National Marine Fisheries Service (NMFS)
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- Klawock Cooperative Association

Refer to the preceding section for additional public involvement discussion.

Government to Government Consultation with Tribes

Consultation with tribal governments and ANCSA Corporations was conducted both in the context of government to government relations and to determine potential effects and concerns regarding archaeological and historic sites and traditional uses . The following Tribal governments and Native Corporations were consulted regarding the Tuxekan Project.

- Klawock Cooperative Association
- Craig Community Association
- Organized Village of Kasaan
- Hydaburg Community Association
- Klawock Heenya Corporation
- Shaan Seet Inc.
- Kavilco
- Haida Corp.
- Central Council of Tlingit and Haida Tribes of Alaska
- Sealaska Corporation

A letter was received from Sealaska Corporation June 13, 2001 agreeing with the recommendation of no direct adverse effect. In the letter Sealaska “reserves the right to comment when other aspects of the Tuxekan planning effort are published for public comment.”

Other Alternatives Considered

The interdisciplinary team (IDT) considered ten alternatives for the Tuxekan Project. Five alternatives were eliminated from detailed consideration. Five alternatives were analyzed in detail. These were the No Action Alternative (Alternative 1), Proposed Action (Alternative 2), Modified Proposed Action (Alternative 3), Alternative 4, and the Selected Alternative (Alternative 5). I have reviewed and have determined that these present an adequate range of alternatives for analysis.

Alternatives Eliminated from Detailed Consideration

The following alternatives were considered, but eliminated from detailed consideration and were not carried forward. The majority of these alternatives were suggested or requested by the public during scoping or the DEIS public comment period.

Alternatives to clearcutting

Create an alternative that avoids clearcutting as the harvest method (URS 2001a).

Tuxekan Island is subject to severe winds, as described elsewhere in the document, and the windthrow potential is high for partial canopies that would remain after all but a very light partial harvest (MBG 2001). One study indicated that wind was responsible for approximately one-fourth of the annual tree mortality in southeast Alaska during a seven-year period (Hutcheson et al. 1975). During the course of timber stand examinations for this project, stands were evaluated for windthrow hazard. One unit has extreme potential for windthrow. Three units have very high potential for windthrow. Twenty-six units have high potential, while two units have moderate-high potential, and seven units have moderate windthrow potential. No units in the project area are considered to have low windthrow potential. Minimizing windthrow improves protection of watershed values by limiting siltation into aboveground streams, as well as protection of karst features and associated belowground hydrologic systems.

The Forest Plan requires a reasonable assurance of windfirmness after harvest. It is not feasible to develop an alternative made up of only partial harvest units for this island. Instead, partial harvest is considered on a unit-by-unit basis in the action alternatives.

In addition, the CCR prescription (a two-aged management system), and the application of standards and guidelines for marten and goshawk, which utilize the 1:1 acre ratio of harvest to retention reduce the amount of clearcutting dramatically. For these reasons, I have determined that no additional alternative is necessary to address this concern (*FEIS, Chapter 3, Vegetation Management, Vegetation Management Summary, Table 3-79. Acres affected by each action alternative,* p. 3-155).

For these reasons, this alternative has been eliminated from further consideration.

Small-operator sales

Create an alternative that would provide small-volume sales (typically less than 1 million board feet [MMBF]) only to small operators in order to maximize the benefit to local businesses (URS 2001a).

Consideration of such an alternative raised several concerns. First, parts of the unit pool require road construction or reconstruction to make timber harvest feasible. Small operators may not accumulate enough revenue to make such expensive work feasible, thus excluding the operators for whom the alternative was intended. Second, some of the units are feasible for harvest only by helicopter, and typically the small operator cannot afford helicopter logging.

To maximize the opportunities for small operators, individual harvest units that would likely be of interest to small operators are identified in the unit cards. Typically, these are small units near existing roads, harvestable with conventional methods available to small operators, and not too distant from an MAF. At this time, however, reserving units along new roads for the small operators would jeopardize the economic viability of the sales for the large operators. The needs of small operators would be better met by providing a variety of sale opportunities, rather than by restricting an entire alternative to small sales only. A detailed discussion regarding the available volume for small operators is given in "Issue 2: Timber Supply and Economics."

For these reasons this alternative has been eliminated from further consideration.

High-vulnerability karst

Create an alternative that avoids road construction across high vulnerability karst and construction adjacent to high vulnerability features.

In the DEIS, Alternative 2 was developed to address timber harvesting and road building effects to soils, hydrology, and karst features and systems (Issue 1). Alternative 5, developed following public comment on the DEIS and additional field work, also addresses Issue 1 by eliminating some roads, modifying some prescriptions, and changing harvest methods.

In June of 2005 Forest Service personnel conducted additional field surveys of karst features (Baichtal, 2005, pers. com.) and proposed road relocations (Emley, 2005, pers. comm.). As a result, a number of the proposed road locations were changed to avoid areas of both moderate and high vulnerability karst (Table 1). There is no road construction proposed on high vulnerability karst in any action alternative

I have determined that these adjustments represent the best option for avoiding impacts to karst features and the overall system while still providing access to areas where timber harvest is allowed under the Forest Plan.

None of the action alternative would compromise karst resource values by temporary or NFS road construction or harvesting proposals, and for these reasons this alternative has been eliminated from further consideration.

No helicopter yarding, fewer roads, and harvest of only high value timber units

Create an alternative based on a timber financial efficiency analysis and address the need to minimize impacts to fisheries, high-value marten, deer and marbled murrelet habitat, and wetlands by reducing timber harvest beyond the levels in Alternative 4; and configuring the project to maximize economic efficiencies - removing areas that would be logged by helicopter and building fewer miles of new roads.

The current range of alternatives addresses concerns for wildlife habitat and old-growth connectivity (Alternatives 4 and 5), watershed and karst concerns (Alternative 2), and meeting Forest Plan goals for the timber LUD. A financial efficiency analysis was done for the project (see *Logging Systems and Transportation Analysis, Tuxekan Island EIS, URS, 2001*), identifying units that would yield a positive stumpage even in a low market. Many of the units identified with a positive stumpage during a low market are those that are planned for conventional logging systems with minimal road construction costs.

While it is true that a viable timber sale could be created by including only units that minimize road construction and have high net stumpage values, this would not meet the goals and objectives of the Timber Production LUD within which the majority of the project is located. One of the Forest Plan goals stated for the timber production LUD is to manage these lands for sustained long-term timber yields. By harvesting only units with a high stumpage value and little or no road construction, the economics of future entries could be adversely affected. In order "to manage these lands for sustained long-term timber yields", units with high stumpage values need to be balanced with those having lower stumpage values.

Another objective within the Timber Production LUD is to plan a transportation network of roads and helicopter access that will eventually access most of the suitable timber lands for standard logging or helicopter yarding systems. By harvesting only units with little or no new road construction, the transportation system would not be moving towards this objective. This option would pass on road construction costs and helicopter yarding costs to future projects while removing the highest value units with this entry.

For these reasons this alternative has been eliminated from further consideration.

Extend rotation for existing Productive Old Growth and reserve existing corridors between Small Old Growth Reserves

Harvesting remaining high-volume, low-elevation, old-growth timber would occur only over an extended rotation until surrounding second-growth forest

stands could be expected to provide wildlife habitat characteristics currently being provided by old-growth. Also corridors that connect the remaining fragments of high-volume, old-growth timber would be preserved from further timber harvest.

Alternatives 2, 3, 4 and 5 were designed to meet the purpose and need for the Tuxekan project, the extent of which is to move the project towards the desired condition described for the timber LUD in the Forest Plan. Extending the rotation would not meet the purpose and need for the project.

Thinning represents an investment in timber management for increased yield and improved forest health conditions as well as an improvement in wildlife habitat. Two thinnings, during the lifetime of the stand, are considered a normal practice in southeast Alaska. An early thinning occurs at about 25 years to control stem density and species composition (pre-commercial thinning).

Precommercial thinning of second-growth stands on the island is an on-going activity. Projects currently being completed include precommercial thinning of 1,291 acres of second growth. Ten percent of this thinning is targeted to improve wildlife habitat and one percent to improve riparian habitat.

Stand growth simulation models for second growth on nearby Kosciusko Island (URS 2002b) indicate that a second thinning ("commercial" thinning) should begin around 65 years to maintain a high volume production rate. Stands harvested in the 1940s will reach this average age by 2010. Precommercial thinning has been and is being carried out in second-growth stands on Tuxekan. These have been positive cumulative effects because they improved growth and yield over a range of stand age classes and opened up the stands to improve habitat for wildlife.

The corridors between the small OGRs have been considered and were used to develop Alternative 4. In addition, Alternatives 2 and 5 maintain these corridors to varying degrees.

For these reasons this alternative has been eliminated from further consideration.

Alternatives Considered in Detail but Not Selected

In addition to the selected alternative, I considered the four other alternatives (discussed below) that were analyzed in detail. Alternative 4 is the environmentally preferred alternative. A more detailed comparison of these alternatives can be found in the FEIS (*Chapter 2, Comparison of Alternatives, Tables 2-1, 2-2 and 2-3* pp. 2-29 to 2-46). Table 4 p. 21, displays a comparison of Alternatives 1 through 4 by activities and outcomes. Table 5, p. 23, displays the ranking of activities and outcomes for Alternatives 2 through 5 as expressed as a percentage of the Selected Alternative (Alternative 5).

Summary Rationale for not choosing Alternatives 1, 2, 3, or 4

Alternative 1

I did not select Alternative 1 because it does not respond to the Purpose and Need identified for the Tuxekan Project to:

- Manage the timber resource for production of sawtimber and other wood products from suitable timber lands,
- Provide a timber supply sufficient to meet the annual market demand for Tongass timber and the market demand for the planning cycle,
- Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska,
- Support a wide range of natural resource employment opportunities within Southeast Alaska's communities, and
- Maintain a Forest-wide system of old-growth forest habitat to sustain old-growth-associated species and resources and ensure that the reserve system meets the minimum size, spacing, and composition criteria.

This alternative was developed in response to NEPA requirements for a no action alternative and serves as a baseline for comparison for the action alternatives. This alternative proposes no new activities during this planning period. The proposed action would not be implemented, although other actions independent of this proposal may continue to occur. This alternative would allow the current process of succession to continue.

Alternative 1 proposes neither timber harvest activities nor road construction at this time. Alternative 1 would provide the current level of protection for watersheds, karst systems, and wildlife habitat on the island. Current road densities and maintenance levels would remain in effect.

Approximately 3,787 acres of mature commercial forest, which is currently suitable and available, exists within the project area on National Forest System lands. Existing small OGRs would remain as mapped in the Forest Plan. Alternative 1 neither precludes timber harvest from other areas at this time nor from the project area at some time in the future.

Alternative 2

Alternative 2 was developed by the interdisciplinary team to respond to issues regarding watersheds and karst raised during public scoping. Alternative 2 incorporates most of the interagency recommendations. Units have been adjusted or dropped in Alternative 2: eliminating effects to high vulnerability karst and mitigating effects to carbonates and maintaining connectivity between old growth reserves. The boundaries of the four small OGRs in the project area would be adjusted according to the interagency committee's recommendations, with minor revisions of the interagency small OGRs in VCUs 557 and 587.2 to accommodate harvest in two small areas.

Alternative 2 also recommends 3,942 acres of small OGRs as listed in the "Old-growth Habitat Reserve Review" for Thorne Bay and Craig Ranger Districts, Tongass National Forest, May 2002 (USDA 2002).

The economics of Alternative 2 are better than Alternative 5, because of two factors that contribute to expected bid prices. The two factors that contribute most to the difference in expected bid prices between these alternatives are road and logging costs per CCF. Alternative 2 has a road construction cost per CCF of $25.53 and Alternative 5 has a cost of $31.86/CCF. Alternative 2 has an average of 5,031 CCF per mile of road construction vs. 4,213 CCF per mile in Alternative 5. The higher CCF/mile of road construction ratio in Alternative 2 improves the economics.

Alternative 2 has less NFS and temporary road construction than Alternative 5 (6.2 miles vs. 8.8 miles). It also has less reconstruction than Alternative 5 (0.0 miles vs. 2.0 miles). The total difference in road construction, reconstruction and maintenance costs between the two alternatives is approximately $362,000. The stump-to-truck cost in Alternative 2 is $72.95 and $77.05 in Alternative 5. The total logging cost per CCF in Alternative 2 is $126.03 per CCF vs. $137.33 in Alternative 5 for a difference of $11.30 per CCF. The higher logging cost per CCF in Alternative 5 is due to the higher percentage of helicopter yarding, 116 acres vs. 80 acres in Alternative 2. The total helicopter yarding cost in Alternative 2 is $918,559 and it is $1,353,845 in Alternative 5 for a difference of $435,286. All of these factors contribute to the difference in the expected bid price per CCF of $7.63.

Alternative 2 responds to Issue 1 by reducing the number of units harvested and thereby reducing road construction on carbonates. Alternative 5 responds to this issue by changing logging prescriptions (more helicopter logging) rather than dropping harvest units, and relocating roads to reduce impacts to carbonates.

While Alternatives 2, provides protection to karst resources (Issue 1) and provides the greatest economic return (Issue 2), Alternative 5 responds better to the purpose and need of providing forest products and providing connectivity (see Issue 3). I did not select Alternative 2 because it doesn't provide the best balance between meeting the Purpose and Need for the project as well as addressing all issues.

Alternative 3 – Modified Proposed Action

The NOI and subsequent public involvement for the Tuxekan Island Timber Sale Project (referred to as the Tuxekan Project) proposed timber harvest on approximately 2,100 acres that would produce an estimated harvest volume of 20 million board feet (MMBF). Following further fieldwork and analysis, a Modified Proposed Action (Alternative 3) was more clearly defined.

This alternative includes timber harvest on approximately 573 acres that would produce an estimated harvest volume of 20.2 million board feet (MMBF). By emphasizing timber supply and economics, Alternative 3 (*FEIS, Chapter 2, Comparison of Alternatives, Table 2-2*) responds to Issue #2. It includes the

greatest number of harvest units of all action alternatives. The existing boundaries of the four small OGRs in the project area would be adjusted in limited ways to include additional old-growth stands and high-value deer winter range, and to meet Forest Plan acreage requirements.

This alternative was not selected because it does not provide the best mix of outputs and reduced impacts to the environment. It also had a lower percentage of OGRs that is productive old-growth and did not fully implement the voluntary Interagency Committee Agreement on small OGRs. The boundaries of the four small OGRs in the project area would be adjusted in limited ways to include additional old-growth stands and high-value deer winter range, and to meet Forest Plan acreage requirements. This alternative would have the most impact on connectivity, including the north-south corridor in the center of the island (north fork of Karheen Creek).

Based on the deer model, Alternative 3 would support fewer deer/square mile than Alternative 5. This alternative consistently ranked lowest of the action alternatives for maintaining habitat for species. This is based on higher levels of harvest, increased use of clearcut with reserve harvest prescriptions, and higher open road densities during project activities.

Alternative 3 would have the greatest potential impact to soils with maximum amount of potentially detrimental soil disturbance from timber harvest and road building of all of the action alternatives. Surface erosion is the greatest risk for soil loss with highest amount of harvesting and road building activities. This alternative has the greatest potential impact to McGilvery soils though the topography and implementation of BMPs lowers risk. After project implementation is final in 2012, none of the project area watersheds will be above the 20 percent threshold of concern for water yield. It would also have the highest amount of road construction in RMAs (1.3 miles).

While Alternative 3 best meets the purpose and need for the project by maximizing outputs and has the second highest potential bid value (Issue 2), this alternative does not address Issues 1 and 3 as well as Alternatives 2 and 5. I did not select Alternative 3, because it does not provide the best balance between meeting the Purpose and Ned for the project as well as addressing all issues.

Alternative 4

Alternative 4 was created to responds to Issue #3 (See above). Alternative 4 responds to this issue by emphasizing:

- Retention of wildlife habitat;
- Old-growth connectivity in the interior of the island including recommendation of 3,942 acres of small OGRs as listed in the “Old-growth Habitat Reserve Review” for Thorne Bay and Craig Ranger Districts, Tongass National Forest, May 2002 (USDA 2002); and
- Greater opportunities for sustaining subsistence deer hunting.

Alternative 4 fully implements the interagency committee's recommended boundary changes to all four small OGRs in the project area (Issue 3) and proposes the least amount of harvesting and road building (Issue 1). However, it ranked lowest in meeting the Purpose and Need of the project and Issue 2 (both concerned with providing a sustained flow of wood products and providing a positive economic benefit to the public), and was therefore, not selected.

Conclusion

Alternatives 2 and 4 seek to respond to Issues 1 and 3 by limiting harvest and the associated roadwork necessary to implement the harvest. However, reduction of harvest satisfies neither the Purpose and Need for the project nor Issue 2 (maximize a sustained flow of wood products and economic benefit).

While Alternative 3 best meets the Purpose and Need for the project as well as satisfying Issue 2, it is the least responsive to the Issue 1: karst, soil, and water protection, Issue 3a: the design of small OGRs, and Issue 3b: maintenance of wildlife travel corridor connectivity across the island.

Alternatives 2, 3 and 4 each seek to respond to one of the three significant issues identified for this project, but at the expense of either the Purpose and Need for the project or the other issues. I have compared how Alternatives 2, 3 and 4 respond to the twin goals of meeting the Purpose and Need for the project and satisfying the issues. Alternatives 2, 3 and 4 do not strike a balance between these twin goals as does Alternative 5. Therefore, I have not selected Alternatives 2 through 4.

All action alternatives meet the purpose and need to varying degrees. However, Alternative 5 strikes the best balance of addressing the issues while meeting the purpose and need.

Environmentally Preferred Alternative

I have reviewed all five alternatives with respect to the biological and physical environment, and, protection of historical, cultural and natural resources (FSH 1909.15 §05). Alternative 1 (No Action) differs substantially from action alternatives in that it proposes no new activities at this time. However, this alternative would not meet the Purpose and Need as defined for this project.

I find all of the action alternatives are designed to minimize environmental damage and protect resources. None of the action alternatives exceed Forest Plan thresholds, and the FEIS identified no significant, adverse effects.

Alternative 4 proposes the fewest activities (numbers of harvest units, acres of harvest, miles of total road construction- temporary and NFS), would result in the least ground disturbance across the project area, and is environmentally preferred for those reasons.

Alternatives 4 and 5 meet the Forest Plan goals and objectives at different levels, and neither alternative exceeds Forest Plan thresholds. However, Alternative 5 best satisfies the Purpose and Need and responds to the issues identified for the Tuxekan Project to a greater extent than Alternative 4.

Table 4. Comparison of Management Activities and Outcomes for Alternatives 1-5

Management Activity			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Summary	Planned unit acreage including unit acres deferred or reserved from harvest		0	916	1,276	845	1,131
	Number of units		0	25	34	24	32
Timber Management	Management system	Even-aged (acres)	0	362	491	284	444
		Uneven-aged (acres)	0	79	79	98	79
	Harvest method	Clearcut with reserves (acres)	0	362	491	284	444
		Single tree selection (acres)	0	79	79	98	79
		Total of all methods (acres)	**0**	**441**	**570**	**382**	**523**
		Deferred or reserved from harvest (unit acres)	NA	475	706	463	608
	Harvest system	Running skyline (acres)	0	272	356	179	297
		Small slackline (acres)	0	64	72	66	73
		Shovel (acres)	0	23	41	31	38
		Helicopter (acres)	0	82	101	105	115
		Yarding corridors through unsuitable land (slopes >72 percent) (acres)	0	0.6	0.8	0.6	0.9
Output	Potential harvest volume (MMBF)		0	15.1	20.2	12.4	18.3

Table 4. Comparison of Management Activities and Outcomes for Alternatives 1-5

Management Activity			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Small Old-growth Reserves (Small OGRs)			The small OGRs would remain as currently mapped. Three of the four reserves do not currently meet Forest Plan minimum requirements or mapping criteria.	The boundaries of the four small OGRs in the project area would be adjusted according to the interagency committee's recommendations, but minor revisions of the interagency small OGRs in VCUs 557 and 587.2 would be made to accommodate harvest in two small areas.	The boundaries of the four small OGRs in the project area would be adjusted in limited ways to include additional old-growth stands and high-value deer winter range, and to meet Forest Plan acreage requirements	Fully implements the interagency committee's recommended boundary changes to all four small OGRs in the project area	Fully implements the interagency committee's recommended boundary changes to all four small OGRs in the project area
Road Work	Construction	NFS road (miles)	0	3.1	4.7	3.9	4.3
		Temporary road (miles)	0	3.1	4.9	2.1	4.5
	Reconstruction (miles)		0	0.0	2.0	0.0	2.0
Economics	Total CCF		0	30,187	40,435	24,766	36,656
	Total MBF		0	15,094	20,218	12,383	18,328
	Expected bid value ($/ CCF)		$0.00	$20.50	$17.72	$8.67	$12.87
	Expected bid value total ($)		$0	$618,747	$716,673	$214,642	$471,826
	Road cost / CCF		$0.00	$25.53	$31.95	$31.22	$30.92
	Logging cost / CCF		0	$126.03	$131.73	$144.79	$135.28
Employment	Number of jobs	Sawmills	0	60	80	49	72
		Logging (includes road construction)	0	37	49	30	45
	Total Employment		0	97	129	79	117
	Direct income		$0	$3,568,496	$4,779,785	$2,927,555	$4,333,073

Table 5: Percentage of activities and outcomes (Action Alternatives) expressed as a Percent of Alternative 5 (the selected alternative) and ranked from highest to lowest [a]

Management Activity			Rank – Highest to Lowest			
			Highest	=>	=>	Lowest
			Percent of Alternative 5			
Summary	Planned unit acreage including unit acres deferred or reserved from harvest		Alt 3 – 113%	**Alt 5 100%**	Alt 2 – 81%	Alt 4 – 78%
Timber Management	Harvest method	Clearcut with reserves (acres)	Alt 3 - 111%	**Alt 5 100%**	Alt 2- 82%	Alt 4 – 63%
		Single tree selection (acres)	Alt 4 – 125%	**Alt 5 100%**	Alts 2 and 3 – 99%	
		Total of all methods (acres)	Alt 3 – 109%	**Alt 5 100%**	Alt 2 – 85%	Alt 4 - 73%
	Harvest system	Running skyline (acres)	Alt 3 - 121%	**Alt 5- 100%**	Alt 4- 60%	Alt 2 – 25%
		Small slackline (acres)	**Alts 3 and 5 -100%**		Alt 4 – 93%	Alt 2 – 89%
		Shovel (acres)	Alt 3 – 108%	**Alt 5 – 100%**	Alt 4 – 84%	Alt 2 – 63%
		Helicopter (acres)	**Alt 5 - 100%**	Alt 4 – 91%	Alt 3 – 87%	Alt 2 – 69%
Output	Potential harvest volume (MMBF)		Alt 3 - 110%	**Alt 5 -100%**	Alt 2 – 82%	Alt 4 – 67%
Road Work	Construction	NFS road (miles)	Alt 3 – 109%	**Alt 5 – 100%**	Alt 4 – 91%	Alt 2 – 72%
		Temporary road (miles)	Alt 3 – 109%	**Alt 5 – 100%**	Alt 2 – 69%	Alt 4 – 47%
	Reconstruction (miles)		**Alts 3 and 5 -100%**		Alts 2 and 4 -0%	
Economics	Total CCF		Alt 3 – 110%	**Alt 5 – 100%**	Alt 2 – 82%	Alt 4 – 67%
	Expected bid value ($/ CCF)		Alt 2 – 152%	Alt 3 – 138%	**Alt 5 – 100%**	Alt 4 – 67%
	Expected bid value total ($)		Alt 3 – 152%	Alt 2 – 131%	**Alt 5 – 100%**	Alt 4 – 45%
	Road cost / CCF		Alt 3 – 103%	Alt 4 – 101%	**Alt 5 – 100%**	Alt 2 – 82%
	Logging cost / CCF		Alt 4 – 107%	**Alt 5 – 100%**	Alt 3 – 97%	Alt 2 -93%
	Total Employment		Alt 3 – 110%	**Alt 5 – 100%**	Alt 2 – 83%	Alt 4 – 68%
	Direct Income		Alt 3 – 110%	**Alt 5 – 100%**	Alt 2 – 83%	Alt 4 – 68%
Wildlife and Subsistence	High value deer habitat harvested		Alt 3 – 109%	**Alt 5 100%**	Alt 2 – 84%	Alt 4 72%
	Deer per square mile / deer availability		**Alt 5 – 100%**	Alt 4 -100%	Alt 3 – 100%	Alt 2 100%

[a] Alternative 1 – No Action would rank the lowest for all activities/outputs except for Wildlife and Subsistence in which it would rank highest because of no harvesting in high quality deer habitat.

Comparison of Alternatives by Issue (based on Table 5)

Issue 1 - Watershed Health and Karst System Protection

Ground disturbance due to timber harvesting and road building will result in increased cumulative effects to soils, hydrology, and karst features and systems within Tuxekan project area watersheds.

Between the release of the DEIS and the FEIS, all roads were relocated off of high vulnerability karst.

Alternatives 2 and 4 respond to the Issue 1 by proposing the least harvest acres (total all methods), 85 and 73 percent respectively of Alternative 5; NFS road building (72 percent and 91 percent respectively of Alternative 5); and temporary road building (69 percent and 47 percent respectively of Alternative 5). When compared to Alternative 5, Alternative 3 proposes the greatest amount of harvest acres (109 percent), NFS road building (109 percent), and temporary road building (109 percent).

I have reviewed these findings and have found them to be satisfactory for alternative comparison in my decision.

Issue 2 - Timber Sale and Local Economics

The proposed project may not provide jobs and income benefiting local residents or provide a positive economic return to timber sale purchasers.

When compared to Alternative 5, Alternative 3 would maximize timber production and subsequently the CCF volume (110 percent), followed by Alternative 5 (100 percent), Alternative 2 (82 percent), and Alternative 4 (67 percent). However, while Alternative 3 (152 percent) would produce the greatest value (expected total bid value of Alternative 5), Alternative 2 would have the next highest expected total bid value (131 percent), followed by Alternative 5 (100 percent) and Alternative 4 (45 percent). For both total employment and direct income, Alternative 3 ranks highest (110 percent), followed by Alternative 5 (100 percent), Alternative 2 (83 percent), and Alternative 4 (68 percent).

I have reviewed these findings and feel that Alternative 5 represents the best balance and trade-off regarding economics.

Issue 3 – Wildlife

3a. The small OGRs as originally mapped do not meet Forest Plan minimum requirements. There is concern that because of past harvest on the island, habitat connectivity between small OGRs would be further compromised.

3b. Proposed harvesting in the project area would reduce high value deer habitat adversely impacting subsistence users.

The first part of the issue is best addressed by Alternatives 4 and 5. Harvest units have been adjusted to incorporate fully the interagency recommendations for the

small OGRs. Alternative 2 incorporates most of the interagency recommendations. Alternative 3 used a different scenario for old growth reserves, which does not incorporate the interagency recommendations, but does meet the Forest Plan direction for size and quantity of productive old growth.

Alternative 4 maximizes connectivity of wildlife travel corridors through the interior of the Island (a public concern), followed by Alternatives 5, 2, and 3 based on the units included for harvest.

Alternative 3 would have the greatest number of acres of harvested (109 percent) in high value deer habitat. Alternatives 2 and 4 and would have the fewest acres of high value deer habitat acres harvested, 84 percent and 72 percent (of Alternative 5) respectively.

Based on these harvesting levels, the Tongass deer model predicted cumulatively that habitat would be provided to support the same level of deer per square mile in all action alternatives. The direct effects of the alternatives do not represent a significant possibility of restriction on subsistence uses of deer. The number of deer per square mile supported in the Tuxekan Project Area would surpass the recommended 18 deer per square mile as presented in the 2000 Monitoring and Evaluation Report by 5 deer per square mile.

I have reviewed these findings and have found them to be satisfactory for alternative comparison in my decision.

Findings Required By Law

National Forest Management Act 36 CFR 219 (1982 rule)

The National Forest Management Act (NFMA) requires specific determinations in this Record of Decision including: consistency with the Forest Plan, a determination of clearcutting as the optimal harvest method, and specific authorizations of created openings over 100 acres in size.

36 CFR 219.12(a)(2)(ii) and 16 USC 1604 (k) Identification of lands not suitable for timber production is required in the plan, but final determination of suitability for timber production needs to be made in "project and activity decisionmaking".

The FEIS states that the suitable and available timber in the analysis area (*Chapter 1, Suitable and Available Timber Lands, Table 1-4 Acres by Suitability type,* p.1-10), is 3,787 acres out of a 17,730-acre project area that encompasses all of Tuxekan Island (*FEIS, Chapter 1, Summary* p. 1-1). This determination is based on field reviews, and on-the-ground inventories.

16 USC 1604 (g) (3) (E) insure that timber will be harvested from National Forest System lands only where—

(i) soil, slope, or other watershed conditions will not be irreversibly damaged;

Alternative 5 will meet Forest Plan standards for continued soil productivity. Alternative 5 will have the second greatest impact to soils.

Alternative 5 will have lower risk to long-term productivity than Alternative 3 due to lower impact project design features. Alternative 5 lowers risk by switching to full suspension helicopter yarding in unit 560-411 and the southwest portion of 560-412. Alternative 5 also drops clearcut with reserve (CCR) harvest and associated road building in units 456-452 and 460-406 for a net reduction in clearcut with reserve harvest of 47 acres (*FEIS, Chapter 3, Issue 1, Soils,* pp. 3-11 to 3-12).

The topography of the Tuxekan project area is not prone to mass erosion (i.e. soil creep, soil slumps, landslides, mudflows, debris flows, debris avalanches and torrents, rockfalls, and snow avalanches) since soils are thin on steep slopes.

Surface erosion by water is the primary erosion process on Tuxekan Island due to intense rainfall. Field visits found Units 560-412 and 587.2-414 to have surface erosion concerns (see Unit cards, Appendix 1) in reserve portions of the unit. Similarly, surface erosion may not be as critical since many of the > 72 percent slope areas are bedrock. Alternative 5 has the least risk of all of the action alternatives for surface erosion based on the combination of clearcutting with reserves and cable logging systems (*FEIS, Chapter 3, Soils, Effects common to all action alternatives, Figure 3-2. Measure 1SP1 Soil erosion: Slope evaluation using harvest acres on steep slopes (30-72%) - clearcut acreage within slope classes 0-30, 30-72, and >72 percent,* p. 3-8).

(ii) there is assurance that such lands can be adequately restocked within five years after harvest;

All units proposed for regeneration harvest (CCR and STS) are expected to meet the stocking requirements within five years as required by NFMA regulations (36 CFR 219.27(c)). Stocking surveys will be completed after the third growing season following harvest. Natural regeneration is expected to be sufficient to meet the stocking requirements. This is based on years of regeneration survey experience on the Tongass (*Forest Plan Appendix G*). Experience with these stand types permits scheduling of walk-through examinations, rather than formal, systematic sampling.

(iii) protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat;

Alternative 5 will construct the fewest road acres within Riparian Management Areas (RMAs) (*FEIS, Chapter 3, Issue 1, Hydrology, Riparian Management Areas (RMAs),* pp 3-32 to 3-35). No harvest will occur within RMAs per standards and guidelines listed in the 1997 Forest Plan. Approximately 3.1 acres of wetlands will have the potential to be impacted by timber harvest. This is less than 0.1 percent of the wetlands that occur within the project area. Approximately 180 feet of wetland

would be crossed with temporary road construction. Implementation of BMP 12.5 (Wetland Identification, Evaluation, and Protection; FP Appendix C, p. C-2) would mitigate effects to the degree that total wetland function, integrity, and value would not be compromised. There are currently 44 road or stream crossings within the Tuxekan Project Area. Alternative 5 proposes ten additional crossings. No roads construction is proposed on slopes in excess of 67 percent, which meets Forest Plan standards and guidelines. Because of the low topographic relief of the landscape and the shallow soils on steep slopes, road construction is not expected to trigger mass movement activity for any action alternative (*FEIS, Chapter 3, Issue 1, Soils, Effects common to all action alternatives,* p. 3-8).

(iv) the harvest system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber.

In the Tuxekan analysis area the CCR prescription was applied primarily to reduce windthrow potential in remaining stands, meet marten and goshawk standards and guidelines, regenerate desired tree species such as Sitka spruce, improve economics, and be compatible with standard logging systems. The harvest method and logging systems were selected based on a combination of these factors, and not based primarily on the greatest return or output (*FEIS, Chapter 3,Other Resources, Vegetation Management, Vegetation Management Direct and indirect Effects,* pp. 3-139 to 149 and *Vegetation Management Direct / Indirect Effects Specific to Alternative 5,* p. 3-155).

16 USC 1604 (g) (3) (F) insure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an even-aged stand of timber will be used as a cutting method on National Forest System lands only where—

(i) for clearcutting, it is determined to be the optimum method, and for other such cuts it is determined to be appropriate, to meet the objectives and requirements of the relevant land management plan;

No units will be harvested with traditional, even-aged clearcut systems as a result of this decision. The largest opening created will be 42 acres in size and is located in unit 560-401. The average size of opening across the project is 16 acres.

The traditional clearcut harvest has been modified and is referred to as clearcut with reserves (CCR) in the *FEIS* (*Chapter 3, Vegetation Management, Silvicultural Prescriptions, Clearcut with Reserves,* p. 3-140). The CCR regeneration method is a two-aged management system. Clearcuts with reserves result in two-aged regenerated stands along with an equal or greater acreage of timber stands deferred from harvest at this time. In addition, within the harvested portion of the unit, 10 percent or more of the original stand structure, is retained. Adequate amounts of downed woody material are left after harvest. In the no-harvest portion of each unit, 100 percent of the original stand structure is retained for other resource concerns. The

combination of harvest and no-harvest areas results in at least 30 percent canopy closure for the unit area as a whole. Alternative 5 will result in the second greatest proportion of treated area in stands with two age classes. Species diversity over the landscape is expected to be relatively high due to aggressive colonization by spruce and manipulation of the cedar component in follow-up intermediate treatments.

(ii) the interdisciplinary review as determined by the Secretary has been completed and the potential environmental, biological, esthetic, engineering, and economic impacts on each advertised sale area have been assessed, as well as the consistency of the sale with the multiple use of the general area;

The analyses in the FEIS included an interdisciplinary review of the potential environmental, biological, esthetic, engineering, and economic impacts that is found in the *FEIS, Chapter 3 – Affected Environment, Environmental Consequences, and Cumulative Effects*. I have determined that this sale has been adequately assessed for these impacts as well as checked for consistency of the sale with the multiple use of the general area (*FEIS, Chapter 1, Forest Plan direction summary*, pp. 1-7 to 1-11).

(iii) cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain;

Green tree retention within each of the harvest units and corresponding shape will reduce the overall visual effect. Impacts to scenery will remain relatively constant over time as areas of past harvest regenerate and older stands are harvested. Alternative 5 will achieve a higher level of visual quality than the Adopted Visual Quality Objective (VQO) of Maximum Modification for the project area.

No harvest units are planned in the foreground views from the waterway viewpoints. Under the Maximum Modification VQO, up to 50 percent allowable visual disturbance may be absorbed within a viewshed. The proposed harvest units fall within the middle-ground and background distance zone from the established viewpoints. Therefore, the Maximum Modification VQO applies to these areas. Under Alternative 5, less than 1 percent to 3 percent of the acres of harvest will be seen from the seven viewpoints. This alternative will meet the 50 percent total visual disturbance cumulative effects requirement per viewshed established in the Forest Plan, and the Maximum Modification VQO.

(iv) there are established according to geographic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: Provided, That such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm; and

The Tongass Forest Plan set maximum size openings at 100 acres. No units will be harvested with traditional, even-aged clearcut systems as a result of this decision. No openings will be created that are greater than 42 acres in size, with an average opening size of 16 acres. In the Tuxekan analysis area the CCR prescription was applied primarily to reduce windthrow potential in remaining stands, meet marten and goshawk standards and guidelines utilizing the 1:1 acre ratio for retention in large patches, regenerate desired tree species such as Sitka spruce, improve economics, and to be compatible with standard logging systems (*FEIS, Chapter 3,Other Resources, Vegetation Management Vegetation Management Direct and indirect Effects,* pp. 3-139 to 149 and *Vegetation Management Direct / Indirect Effects Specific to Alternative 5,* p. 155).

(v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource.

In the Tuxekan analysis area the CCR prescription was applied primarily to reduce windthrow potential in remaining stands, meet marten and goshawk standards and guidelines utilizing the 1:1 acre ratio for retention in large patches, regenerate desired tree species such as Sitka spruce, improve economics, and be compatible with standard logging systems (*FEIS, Chapter 3, Issue 1,* p. 3-22). All units where CCR is prescribed will contain areas where existing stand structure is preserved to meet marten and goshawk standards and guidelines. These areas will provide shrub and herbaceous vegetation over the landscape, as well as retaining some interior forest habitat.

All harvest methods stipulate partial- to full-suspension yarding with consideration for McGilvery soils. In this carbonate rock terrain, these soils are scattered on rock outcrop and thus are not as susceptible to erosion. No high-risk mass movement was evident through ground surveys and mass movement soil mapping within proposed harvest units. Though all action alternatives comply with the Forest Plan, the alternatives vary in risk to erosion using soil erosion indicators (*FEIS, Chapter 3, Issue 1,* pp. 3-7 to 3-10).

Tongass Land Management Plan

This decision is consistent with the revised Forest Plan. I have reviewed the management direction, standards and guidelines, and the schedule of activities for the Value Comparison Units (VCUs) included in Alternative 5. I find Alternative 5 to be consistent with these elements. The activities authorized in this decision are consistent with the standards and guidelines and management prescriptions of the revised Forest Plan (*FEIS, Appendix G, Harvest Prescriptions*).

Tongass Timber Reform Act (TTRA)

Harvest units were designed with no less than 100-foot buffer zones for all Class I streams and Class II streams which flow directly into Class I streams as required in Section 103 of the TTRA. The actual widths of these buffers follow Forest Plan Riparian Standards and Guidelines that greatly exceed TTRA requirements (*FEIS, Chapter 3, Other resources, Fisheries, Fisheries Direct / Indirect Effects Common to Alternatives 2, 3, 4 and 5, Windthrow/Windfirm Buffers,* p. 3-210). I have determined that this action will be in compliance with the TTRA.

Endangered Species Act

Actions authorized in Alternative 5 are not anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in the Tuxekan Project Area. A Biological Assessment is included in project planning record. I have determined that this action will not have any adverse impacts on any threatened or endangered species (*FEIS, Chapter 3, Issue 3, Wildlife, Threatened and Endangered Species,* p. 3-161).

Bald Eagle Protection Act

Management activities within 330 feet of an eagle nest site are restricted by an interagency agreement between the Forest Service and the U. S. Fish and Wildlife Service to facilitate compliance with the Bald Eagle Protection Act. The only features within 330 feet of existing nest trees are existing roads and the Marine Access Facility (MAF). Alternative 5 includes no road construction or timber harvest within 330 feet of a known bald eagle nest (*FEIS, Chapter 3, Wildlife, MIS Accounts, Bald Eagle,* pp. 3-190 to 3-192). I have determined that this action will be in compliance with the Bald Eagle Protection Act.

Clean Water Act

The design of harvest units and roads for the Selected Alternative were guided by standards and guidelines and direction contained in the revised Forest Plan, Alaska Regional Guide, and applicable Forest Service manuals and handbooks. The Unit Design Cards (Appendix B) contain Best Management Practices (BMPs) prescribed to prevent or reduce nonpoint sediment sources. Site-specific application and monitoring of BMPs are expected to comply with applicable State Water-Quality Standards Regulations. These regulations provide for variances from anti-degradation requirements and water-quality criteria. The harvest and road-building operators are responsible for compliance, including obtaining any variance required by the State, and will be monitored for compliance by the Forest Service. I have determined that this action will be in compliance with the Clean Water Act.

Magnuson-Stevens Fishery Conservation and Management Act of 1996

Magnuson-Stevens Fishery Conservation and Management Act of 1996 Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act states that all federal agencies must consult the National Marine Fisheries Service (NOAA Fisheries) for actions or proposed actions that may adversely affect EFH. Consultation began when NOAA Fisheries received a draft copy of the EIS with the EFH Assessment. The NOAA Fisheries has not provided additional conservation recommendations. Incorporation of this Assessment in the FEIS satisfies the consultation requirements.

The potential effects of the Tuxekan Project on Essential Fish Habitat (EFH) have been evaluated (*FEIS, Chapter 3, Fisheries,* pp. 3-216 to 3-218*;* additional information in the planning record). The Tuxekan Project may adversely affect EFH as a result of vegetation management activities and associated temporary road building. However, by implementing Forest Plan standards and guidelines and BMPs, I have determined that the direct, indirect, and cumulative effects of the proposed activities on EFH would be minimized.

National Historic Preservation Act

Cultural resource surveys of various intensities have been conducted in the project area. The State Historical Preservation Officer has been consulted, and the provisions of 36 CFR part 800 are being complied with. Forest Service timber-sale contracts contain enforceable measures for protecting any undiscovered cultural resource that might be encountered during sale operations. I have determined, consistent with the Forest Service direction on cultural resources, that there will be no adverse effects. The Forest Service has completed the Section 106 review for all timber harvest related activities displayed in the FEIS. This includes roads and units in all alternatives. I have determined that this action will be in compliance with the National Historic Preservation Act.

Federal Cave Resource Protection Act of 1988

The actions in the Selected Alternative will have no direct, indirect, or cumulative effect on any significant cave. There are few occurrences of carbonate rock and associated cave resources within the Project Area. Field reconnaissance identified areas of concern and Forest Plan standards and guidelines have been applied to these areas (*FEIS, Chapter 3, Issue 1, Karst,* pp. 3-45 to 3-65).

In compliance with karst and cave resource standards and guidelines all high vulnerability karst lands have been removed from proposed timber harvest units and no roads cross high vulnerability karst(*FEIS, Chapter 3, Issue 1, Karst,* pp. 3-45 to 3-65). I have determined that this action will be in compliance with the Federal Cave Resource Protection Act.

ANILCA Section 810

Subsistence Evaluation and Findings

A subsistence evaluation was conducted for the five alternatives considered in detail for the Tuxekan Final EIS, in accordance with Alaska National Interest Lands Conservation Act (ANILCA) Section 810 (*FEIS, Chapter 3, Issue 3 – Wildlife, Subsistence: Alaska Native Interest Lands Conservation Act (ANILCA),* p. 3-106*; ANILCA Compliance,* pp. 3-119 to 3-121). ANILCA Section 810 hearings were held in Coffman Cove, Wrangell, Klawock, Naukati, Thorne Bay, and Whale Pass. The evaluation of comments from the public, subsistence hearing testimony, and additional analysis indicates that the potential foreseeable effects from the alternatives in the Tuxekan Project Area do not indicate a significant possibility of a significant restriction of subsistence uses for bear, furbearers, marine mammals, waterfowl, salmon, other finfish, shellfish, and other foods such as berries and roots. However, the Forest Plan FEIS concluded that the potential cumulative effects of implementation of the Plan [forest-wide] "may result in a significant restriction to subsistence use of deer due to the potential effects of projects on the abundance and distribution of these resources, and on competition for these resources" (*Forest Plan Record of Decision* p. 36). This would be true under all alternatives, including the no-action alternative. The Forest Plan analysis was based on an assumed 18 percent increase in community population growth for each of the first two decades and a 15 percent increase for each of the next three decades (*Forest Plan FEIS Par 2*, p 3-528). However, population numbers actually dipped in many southeast Alaska communities between 1990 and 2000. Marginal overall population growth and declines in the southeast Alaska region over the last decade have been masked by a 16 percent population growth in Juneau, the region's largest urban center. The Wrangell-Petersburg census area experienced a decline of 5.1 percent over the past decade. In the Outer Ketchikan/Prince of Wales census area, the population decreased by 6 percent between 1996 and 2000. Prince of Wales Census subarea has shown an average annual decline of approximately 2.8 percent annually since 2000 (*Tuxekan FEIS* p. 3-254). Given the recent population declines, it is likely that this restriction, if required, would occur somewhat later than predicted.

The possibility of this restriction is necessary, consistent with sound management principles for the utilization of public lands, and will involve the minimal amount of public lands necessary to accomplish the purposes of the use. I have determined that reasonable steps have been taken to minimize the adverse impacts upon subsistence uses and resources (*Tuxekan FEIS, Chapter 3, Issue 3 – Wildlife, Subsistence, ANILCA Compliance,* pp. 3-119 to 3-121).

Executive Orders

Executive Order 11988

Executive Order 11988 directs Federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains. The Selected Alternative does not propose floodplain occupancy or modifications. Roads crossing floodplains have been designed to pass floods in accordance with BMP 14.17 (FSH 2509.22). Road cards (*Appendix C*) provide site-specific details. I have determined that this action will be in compliance with Executive Order 11988.

Executive Order 11990

Executive Order 11990 requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. The Selected Alternative will harvest about 3.1 acres, or 0.1 percent of the forested wetlands within the Tuxekan Project Area. Construction of a temporary road accessing Unit 557-404 would impact 180 feet of wetlands. The FEIS, (*Chapter 3, Hydrology, Wetlands*, pp. 3-27 to 3-32) describes the types and amounts of wetlands in the project area and how they will be affected by this project. I have determined that this action will be in compliance with Executive Order 11990.

Executive Order 12898

Executive Order 12898 directs Federal agencies to identify and address the issue of environmental justice, i.e., human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. The Executive Order specifically directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife. The issue of environmental justice has been addressed through the Tuxekan environmental analysis by identifying low income or Native communities that may be affected by the proposed action; by ensuring that scoping and public involvement activities reach those communities; by evaluating the effects of the proposed action on such communities; and by documenting the analysis. Detailed discussion of potential project effects on communities and subsistence is presented in the FEIS (*Chapter 3, Socioeconomics, Environmental Justice*, pp. 3-258 to 3-262).

The communities of Klawok and Wrangell have significant Native populations and have been evaluated for disproportionate or adverse environmental effects of the proposed action.

Notice of ANILCA Section 810 subsistence meetings was sent in July 2005 to several agencies, advisory committees, and tribes. These meetings were held in Naukati on August 22 and in Craig/Klawock on August 23, 2005. No publics attended either meeting. A Tlingit tribal elder from Klawock telephoned on August 22 to express concern for tribal cultural resources and traditional cultural

properties on Tuxekan Island. The elder's concerns have been addressed through tribal consultation and cultural resource protection measures.

I have determined that the Tuxekan Project will not have a disproportionate effect on Native or low income communities, based on community outreach discussions, review of ANILCA Section 810 requirements and the Environmental Justice analysis conducted (*FEIS, Chapter 3:, Issue 3 – Wildlife, Subsistence: Alaska Native Interest Lands Conservation Act (ANILCA),* p. 3-106*; ANILCA Compliance,* pp. 3-119 to 3-121; *Socioeconomics, Environmental Justice,* pp. 3-258 to 3-262).

Executive Order 12962

Executive Order 12962 requires Federal agencies to evaluate the effects of proposed activities on aquatic systems and recreational fisheries. Alternative 5 minimizes the effects upon aquatic systems through project design, watershed analysis, application of Forest Plan standards and guidelines, BMPs, and site-specific mitigation measures. Recreational fishing opportunities will remain essentially the same because aquatic habitats are protected through implementation of BMPs and riparian buffers (*FEIS, Chapter 3, Other Resources: Fisheries,* pp. 3-198 to 3-215*, and Recreation*, pp. 3-237 to 3-252, *and Appendix B – Unit Cards*). I have determined that this action will be in compliance with Executive Order 12962.

Executive Order 13007 - "Indian Sacred Sites" (1996)

Executive Order 13007 states: (a) In managing Federal lands, each executive branch agency with statutory or administrative responsibility for the management of Federal lands shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

Tribal consultation conducted with local and regional tribal governments and Alaska Native Corporations in support of the Tuxekan EIS did not result in the identification of any sacred sites within the area of potential effects for the project (*FEIS Chapter 1, Public involvement: Consultation with Agencies, Communities, Native Groups, and Others*, p. 1-17, and *Government to Government Consultation with Tribes*, p. 1-18). Known historic properties that might be considered sacred are located within the coastal buffer. Access to those areas is not impeded by activities associated with this project. I have determined that this action will be in compliance with Executive Order 13007.

Coastal Zone Management Act

The Coastal Zone Management Act of 1972, as amended, while specifically excluding Federal lands from the coastal zone, requires that a Federal agency's activities be consistent with the enforceable policies of a State's coastal

management program to the maximum extent practicable when that agency's activities affect the coastal zone.

The Alaska Coastal Management Program incorporated the Alaska Forest Resources and Practices Act (Forest Practices Act) as the applied standards and guidelines for timber harvesting and processing. The Forest Service standards and guidelines, BMPs, and mitigation measures described in the Tuxekan FEIS meet or exceed the level of protection provided by the enforceable policies of the State Forest Practices Act (*FEIS Chapter 3, Fisheries: Fisheries Summary* p. 213, and *Coastal Zone Management Act*, p. 216).

The State of Alaska, Office of Governmental Coordination, has conducted a consistency review of the project and concurs with the Forest Service that the project is consistent with the Coastal Zone Management Act.

Based on the analysis in the Final EIS, review of the Alaska Forest Practices Act, and comments from State agencies on the Draft EIS, I have determined that Alternative 5 is consistent to the maximum extent practicable with the enforceable policies of the Alaska Coastal Management Program.

Federal and State Permits

Federal and State permits necessary to implement the authorized activities are listed below. More information can be found in Appendix G - Supportive Information, Federal and State Permits, Licenses, and Certifications.

State of Alaska, Department of Environmental Conservation

- Certification of compliance with Alaska Water Quality Standards (Section 401 Certification).
- Solid Waste Disposal Permit (Section 402 of the Clean Water Act).

State of Alaska, Department of Natural Resources

- Authorization for occupancy and use of tidelands and submerged lands.

U.S. Army Corps of Engineers

- Approval of discharged dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).
- Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

U.S. Coast Guard

- Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed across navigable waters (within the tidal influence zone) of the United States.

U.S. Environmental Protection Agency

- Storm water discharge permit.
- National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act).

Implementation

Implementation Process

Implementation of this decision may occur no sooner than 50 days following publication of the legal notice of the decision in the Ketchikan Daily News, published in Ketchikan, Alaska.

This Project will be implemented in accordance with Forest Service Manual (FSM) and Handbook (FSH) direction for Timber Sale Project Implementation in FSM 2431.3 and FSH 2409.18. This direction provides a bridge between project planning and implementation and will ensure execution of the actions, environmental standards, and mitigations approved by this decision, and compliance with the TTRA and other laws.

Implementation of all activities authorized by this ROD will be monitored to ensure that they are carried out as planned and described in the FEIS and ROD, Unit Design and Road Cards, unless modified consistent with direction in the FSM 2432.3 and FSH 2409.18.

ROD Unit Design and ROD Road Cards are contained as attachments to the ROD. These cards are an integral part of this decision because they document the specific resource concerns, management objectives, and mitigation measures to govern the layout of the harvest units and construction of roads. These cards will be used during the implementation process to assure that all aspects of the Tuxekan Project are implemented within applicable standards and guidelines and that resource impacts will not be greater than those described in the FEIS. Similar cards will be used to document any changes to the planned layout, as the actual layout and harvest of the units occurs with project implementation. The implementation record for the Tuxekan Project will display:

- Each harvest unit, transportation facility, and other Project components as actually implemented,
- Any proposed changes to the design, location, standards, and guidelines, or other mitigation measures for the Tuxekan Project, and
- The decisions on the proposed changes.

Process for Change during Implementation

Proposed changes to the authorized Project actions will be subject to the requirements of the NEPA and other laws concerning such changes.

In determining whether and what kind of further NEPA action is required, the Forest Supervisor will consider the criteria in 40 CFR 1502.9(c) and FSH 1909.15, sec. 18, for whether to supplement an existing FEIS. In particular, whether the proposed change is a substantial change to the intent of the Selected Alternative as planned and already approved, and whether the change is relevant to environmental concerns. Connected or interrelated proposed changes regarding particular areas or specific activities will be considered together in making this determination. Cumulative impacts will be considered.

The intent of field verification is to confirm inventory data and to determine the feasibility and general design and location of a unit or road, not to locate the final boundaries or road locations. Minor changes are expected during implementation the better to meet on-site resource management and protection objectives. Minor adjustments to unit boundaries are also likely during final layout for the purpose of improving logging system efficiency. This will usually entail adjusting the boundary to coincide with logical logging setting boundaries. Many of these minor changes will not present sufficient potential impacts to require any specific documentation or action to comply with applicable laws. Some minor changes may still require appropriate analysis and documentation to comply with FSH 1909.15, sec. 18.

Appeal Rights

This decision is subject to appeal pursuant to 36 CFR 215.7 (June 4, 2003). A written Notice of Appeal must be submitted within 45 days after the date the notice of this decision is published in the Juneau Empire, the newspaper of record for this project, published in Juneau, Alaska. The publication date in the newspaper of record is the exclusive means for calculating the time to file an appeal. Those wishing to appeal this decision should not rely upon dates or timeframe information provided by any other source.

Submit the Notice of Appeal to:

USDA Forest Service, Alaska Region
ATTN: Appeals Deciding Officer, Regional Forester
USDA Forest Service
PO Box 21638
Juneau, Alaska 99802-1628
Facsimile number (907) 586-7840
Email: appeals-alaska-tongass@fs.fed.us

Appeals must meet the content requirements of 36 CFR 215.14. At a minimum, your Notice of Appeal must include:

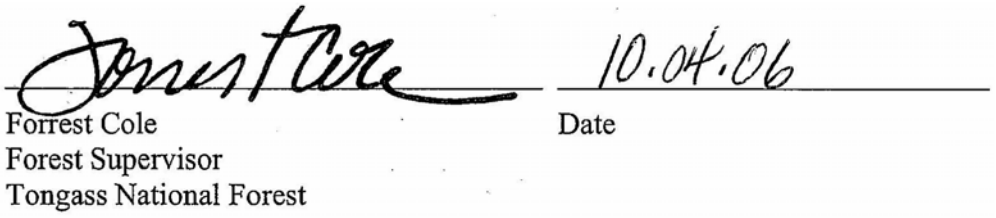
- A statement that your document is an appeal filed according to 36 CFR part 215
- Your name, address, and if possible, telephone number
- The decision being appealed by title and subject
- Decision date and responsible official (below)

Appeals submitted electronically, including attachments, must be in an electronic format compatible with Microsoft Word.

Hand-delivered appeals will be accepted at the Regional Office during normal business hours (8:00 am through 4:30 pm) Monday through Friday, excluding holidays.

Contact Person

The FEIS and supporting documents are available for public review at the Thorne Bay Ranger District office. For further information on this decision, contact Dennis Sylvia, Planner, at the Thorne Bay Ranger District, phone (907) 828-3210.



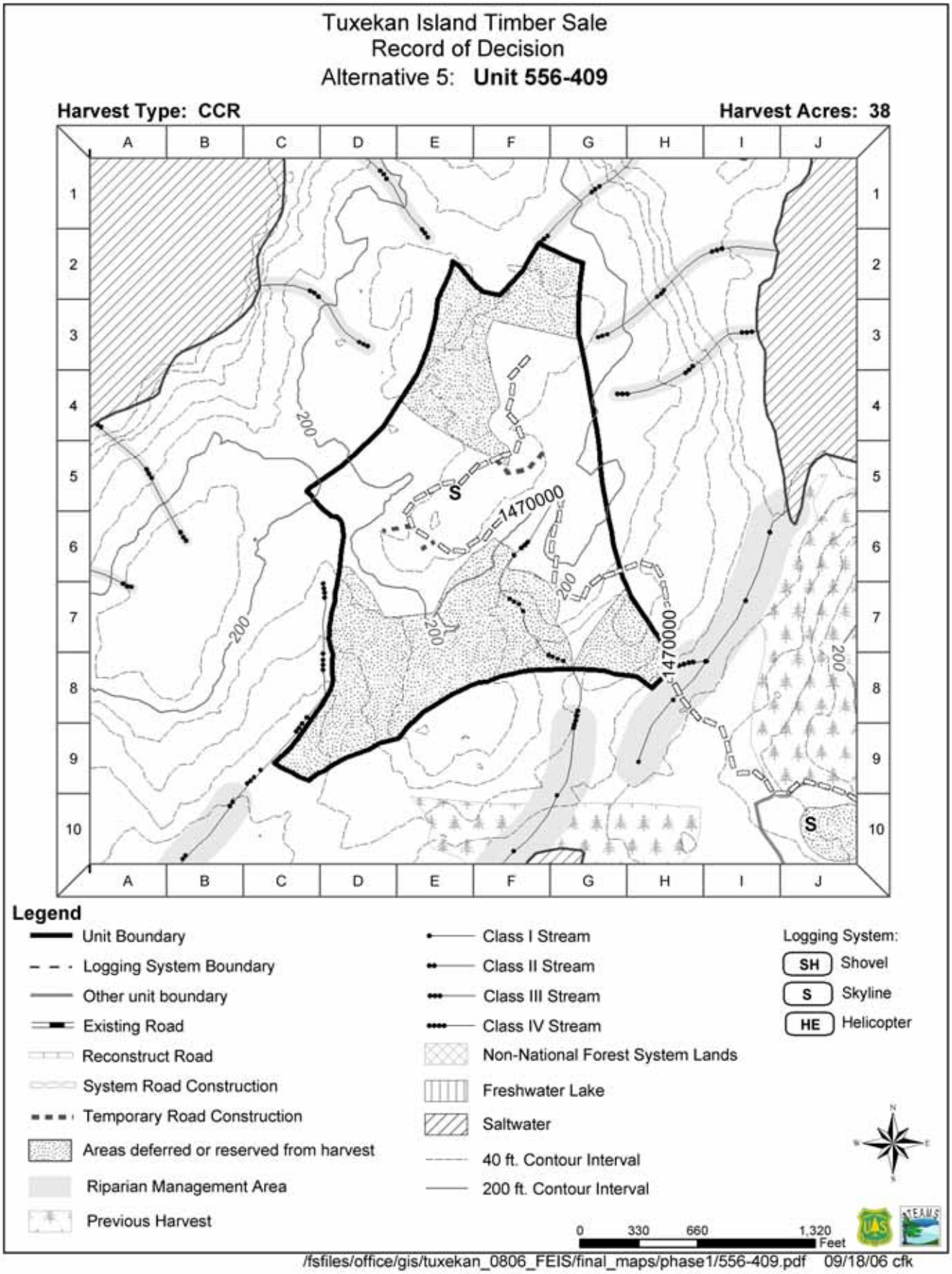
10.04.06

Forrest Cole
Forest Supervisor
Tongass National Forest

Date

Attachments: Appendix 1- ROD Unit cards
Appendix 2 - ROD Road Cards
Appendix 3 - ROD and Access Management Plan Maps
Appendix 4 - Non–Significant Forest Plan Amendment

Appendix 1 - Unit Cards


Tuxekan Island Timber Sale
Record of Decision
Alternative 5: Unit 556-409
Harvest Type: CCR
Harvest Acres: 38
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10
200
1470000
S
Legend
Unit Boundary
Logging System Boundary
Other unit boundary
Existing Road
Reconstruct Road
System Road Construction
Temporary Road Construction
Areas deferred or reserved from harvest
Riparian Management Area
Previous Harvest
Class I Stream
Class II Stream
Class III Stream
Class IV Stream
Non-National Forest System Lands
Freshwater Lake
Saltwater
40 ft. Contour Interval
200 ft. Contour Interval
Logging System:
SH Shovel
S Skyline
HE Helicopter
0 330 660 1,320 Feet
/fsfiles/office/gis/tuxekan_0806_FEIS/final_maps/phase1/556-409.pdf 09/18/06 cfk

Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 556-409 **Quad Map:** Craig D-4 **Photo #:** 00-11-13 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 2017
Total Planned Acres:77 **Harvest Acres:** **Alt 5:** 38

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:**77 **Slopes >72% Harvest** 0
Streams **Class I:** 2 **Class II:** 1 **Class III:** 0 **Class IV:** 3

Soils Input:
Slopes throughout the unit range from 40 to 65% with small, isolated, steeper sections. Soils on slopes in the unit appear relatively stable with no evidence for slope stability concerns. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.

Plant Association: 110 **Forested wetland (%area):**0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Approximately 600 feet of temporary road required. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24. Partial log suspension required (BMP 13.9).

Engineering
Pre-haul maintenance required on 1.2 miles of 1470000 road. Construction of extension to 1470000 road required.

Fish/Watershed

The MM1/Class I stream located on the eastern edge of this unit will require a bridge. Dolly Varden and cutthroat trout presence was verified in this stream, coho presence was not verified. There are no apparent permanent barriers to salmon migration. See Tuxekan Road Card for timing restrictions. Streams are numbered clockwise starting at the southeast corner.

Loc: I 7-8 Stream 1: PA5 portion Class I requires no cut RMA buffer of 100' plus RAW 75'; this stream is located in the southeast corner of the unit.
Loc: H7-8 Stream 1: MM1 portion Class I requires no cut RMA buffer of 120' plus RAW 75'; this portion of the stream is located at the junction with the Class IV stream.
Loc: H8 Stream 1.2: HC2/IV; No RMA; Yard away from stream to reduce slash accumulation
Loc: F6-8 Stream 2: HC5/IV; No RMA; Yard away from stream to reduce slash accumulation
Loc: F9 Stream 2.2: MM1/I portion of this stream is outside of the unit and requires no cut RMA buffer of 120' plus RAW 75'
Loc: C9-7 Stream 3: HC2 and HC5, Class IV, No RMA buffer.
Loc: B10 Stream 3.1 HC2 portion, Class II . This stream is located outside of the southwest corner of the unit. No cut RMA buffer is 100', plus RAW 100'.

Identify and flag Class I, II, III, and IV streams located in the unit during layout. BMPs include 12.4 12.6, 12.6a 13.16, 14.6, 14.14, and 14.17.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not

necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 38 acres; No Cut Area 99 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place located near Cap Island and Shikat Point. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Semi-Primitive Motorized

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the northern and southern portions of the unit were removed and are protected by a 100-ft buffer plus windfirm. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
High windthrow hazard. Stand has sustained significant windthrow from previous harvests. Present stand is scattered old growth and clumps of old growth that withstood previous wind events. Single tree selection – Harvest hemlock 20 inches and greater (species and diameter classes to be refined during layout), up to 25% of stand basal area, which totals 145 sq ft per acre. Designate reserve trees of sufficient size and condition to meet Marten/Goshawk standards and guidelines. Protect residual stand and advanced reproduction. Leave all Alaska yellow cedar that meet reserve tree guides. This sets up an uneven-age management plan, with expected re-entries on a 50-year cycle, with approximately 25% basal area removal at each entry.
Alternative 5: CCR by Running Skyline

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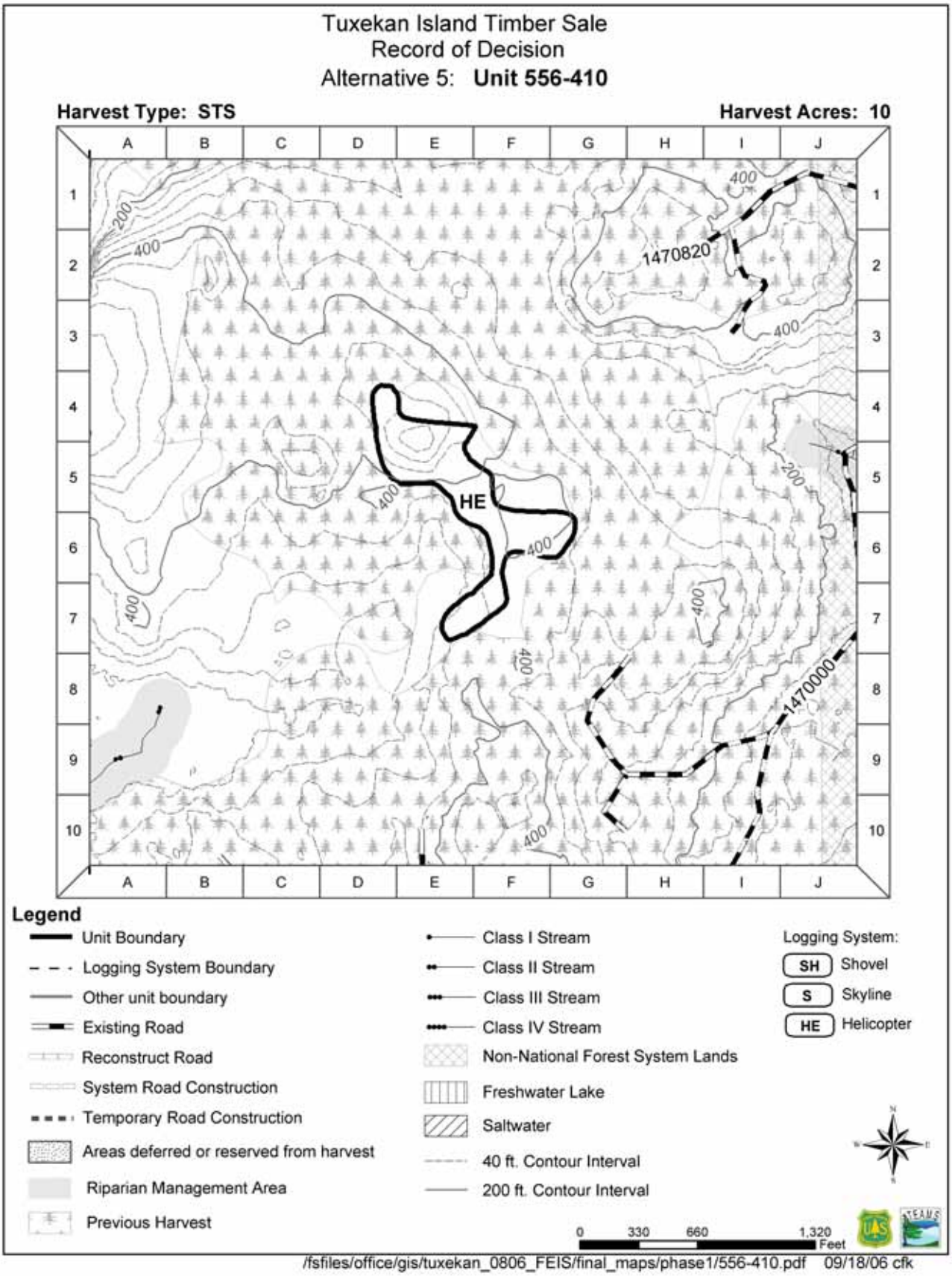
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 556-410 Quad Map: Craig D-4 **Photo #:** 00-10-9 **WAA:** 1531
Alternatives: 2, 3, 5 **Estimated Volume: Alt 5:** 70
Total Planned Acres:10 **Harvest Acres: Alt 5:** 10

Forest Type: Sitka Spruce-Other **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 3 **High:** 3 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 0 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the northern third is three while the remainder is rated two. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 310 **Forested wetland (%area):** 0
Soil Type: 40DEX (44%), 442CE (56%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter yard to existing non-system road (1,200 feet to SE of unit). Partial log suspension required (BMP 13.9).

Engineering
N/A.

Fish/Watershed
No streams were identified in this unit.

Wildlife
Single Tree Selection over harvest area meets marten and goshawk standards and guidelines to maintain an average canopy closure of >/=30%. High
Value Habitat - Deer: Harvest Area 7 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from Viewpoint 2 (Jinhi Bay). Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified/Roaded Natural

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the southern portion of the unit consisting of cliffs were removed. Helicopter will be used to partially cut the unit. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
High windthrow hazard. Small scale gaps throughout stand indicate stem snap and/or small group

windthrow events. Single tree selection –This treatment will likely result in the removal of about 6 trees per acre, most of which will be the tallest spruce. Some damage to the residual stand will be unavoidable. Harvest spruce 20 inches and greater and other species (species and diameter classes to be refined during layout), up to 25% of the basal area (245 sq ft). Designate reserve trees of sufficient size and condition to meet Marten/Goshawk S&Gs. Protect residual stand and advanced reproduction as much as possible. Leave all Alaska yellow cedar that meets safety reserve tree guides. This sets up an uneven-age management plan, with expected re-entries on a 50-year cycle, with approximately 25% basal area removal at each entry.

Alternative 5: Single Tree Selection by Helicopter

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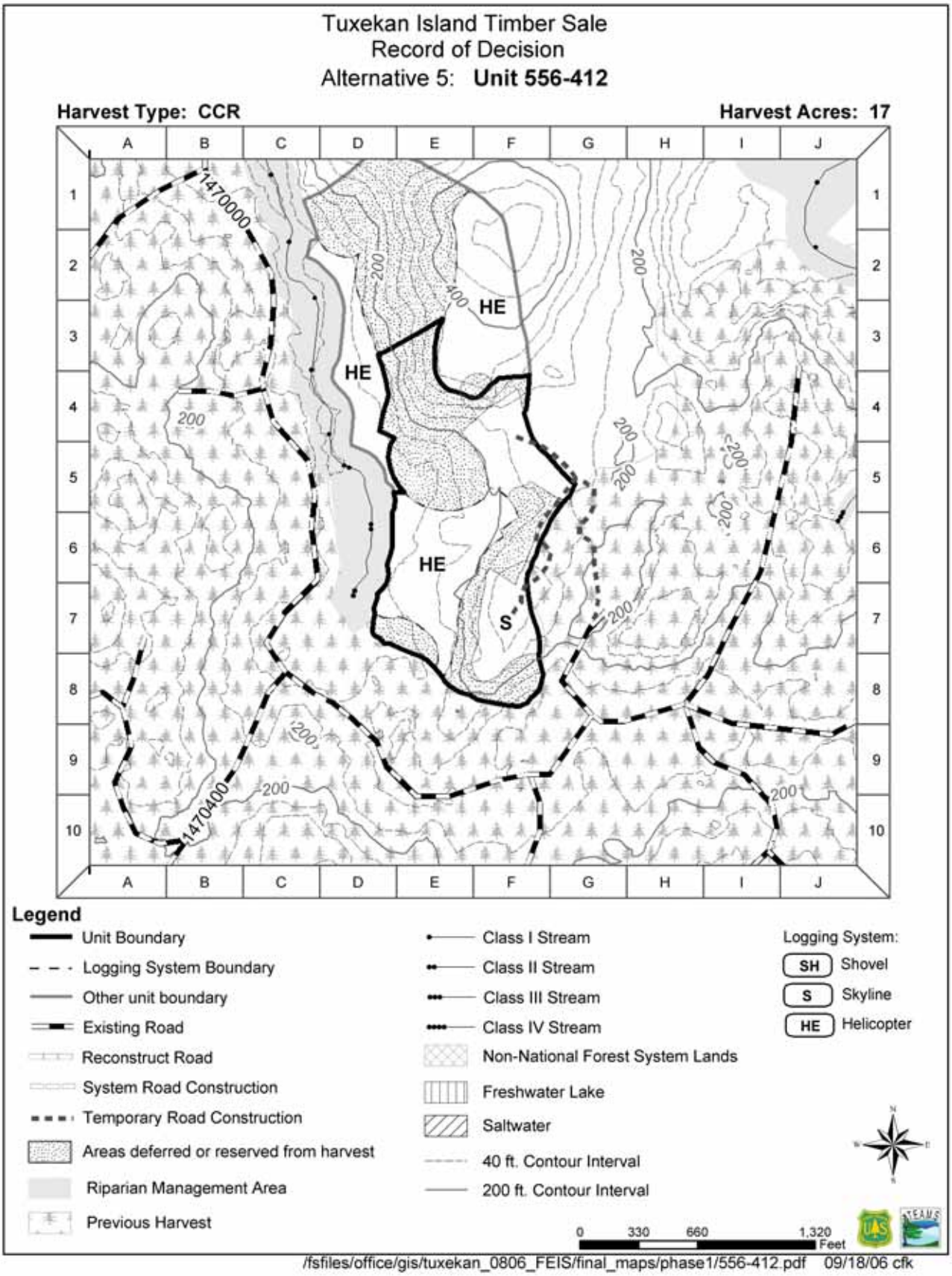
Tuxekan Island Timber Sale
Record of Decision
Alternative 5: Unit 556-412
Harvest Type: CCR
Harvest Acres: 17
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10
1470000
1470400
200
400
HE
HE
HE
S
Legend
Unit Boundary
Logging System Boundary
Other unit boundary
Existing Road
Reconstruct Road
System Road Construction
Temporary Road Construction
Areas deferred or reserved from harvest
Riparian Management Area
Previous Harvest
Class I Stream
Class II Stream
Class III Stream
Class IV Stream
Non-National Forest System Lands
Freshwater Lake
Saltwater
40 ft. Contour Interval
200 ft. Contour Interval
Logging System:
SH Shovel
S Skyline
HE Helicopter
0 330 660 1,320 Feet
/fsfiles/office/gis/tuxekan_0806_FEIS/final_maps/phase1/556-412.pdf 09/18/06 cfk

Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 556-412 Quad Map: Craig D-4 **Photo #:** 00-11-8 **WAA:** 1531
Alternatives: 3, 5 **Estimated Volume: Alt 5:** 437
Total Planned Acres:34 **Harvest Acres: Alt 5:** 17

Forest Type: Western Hemlock-Poorly Drained **RMA acres:** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 34 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 1 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65%. Steep slopes as high as 90-100%+ and subvertical cliff bands were found in the southern and northern portions of the unit. The soil on the slopes in the unit appears relatively stable. The soil on the steep slopes in the central portion of the unit was organic overlying limestone with very little soil development. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. No wetlands present; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 40DEX (43%), 442CE (57%) **Non-forested wetland (%area):** 0

Timber Input:
Unit is planned for helicopter and cable logging systems. Approximately 2,550 feet of temporary road required. Equipment tailholds may have to be utilized along the eastern boundary due to heavy blow down. Rock bolt anchors may be required to the east of Landing 2. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24. Partial log suspension required (BMP 13.9).

Engineering
N/A.

Fish/Watershed
ADF&G catalogued stream #103-90-10980 is located on the western border of this unit. Coho salmon are present and rear within this system. The stream changes to a Class II stream 1/3 of the way along the unit's west boundary.
Loc: D1-4 Stream 1: MC2/MM2 Class I portion requires no cut RMA buffer of 100' plus RAW 75'
Loc: D5-7 Stream 1: PA5/II portion requires no cut RMA buffer of 100' plus RAW 75';
Identify and flag Class I/II stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines.
High Value Habitat - Deer: Harvest Area 17 acres; No Cut Area 17 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place located near Scott Lagoon. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns. An opportunity to enhance recreation exists in creating new recreation sites at Scott Lagoon, where there are historic sites.
VQO: Maximum Modification **ROS:** Roaded Modified

Appendix 1 – Unit Cards

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. Several areas of high vulnerability karst were discovered during inventory and unit layout. These areas were in the southeastern and north central portions of the unit and have been removed from the unit. Individual karst features were protected by a 100-foot no-harvest plus wind firmness buffer. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout the stand indicate stem snap and/or small group windthrow events. Basal area is 222 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline and CCR by Helicopter

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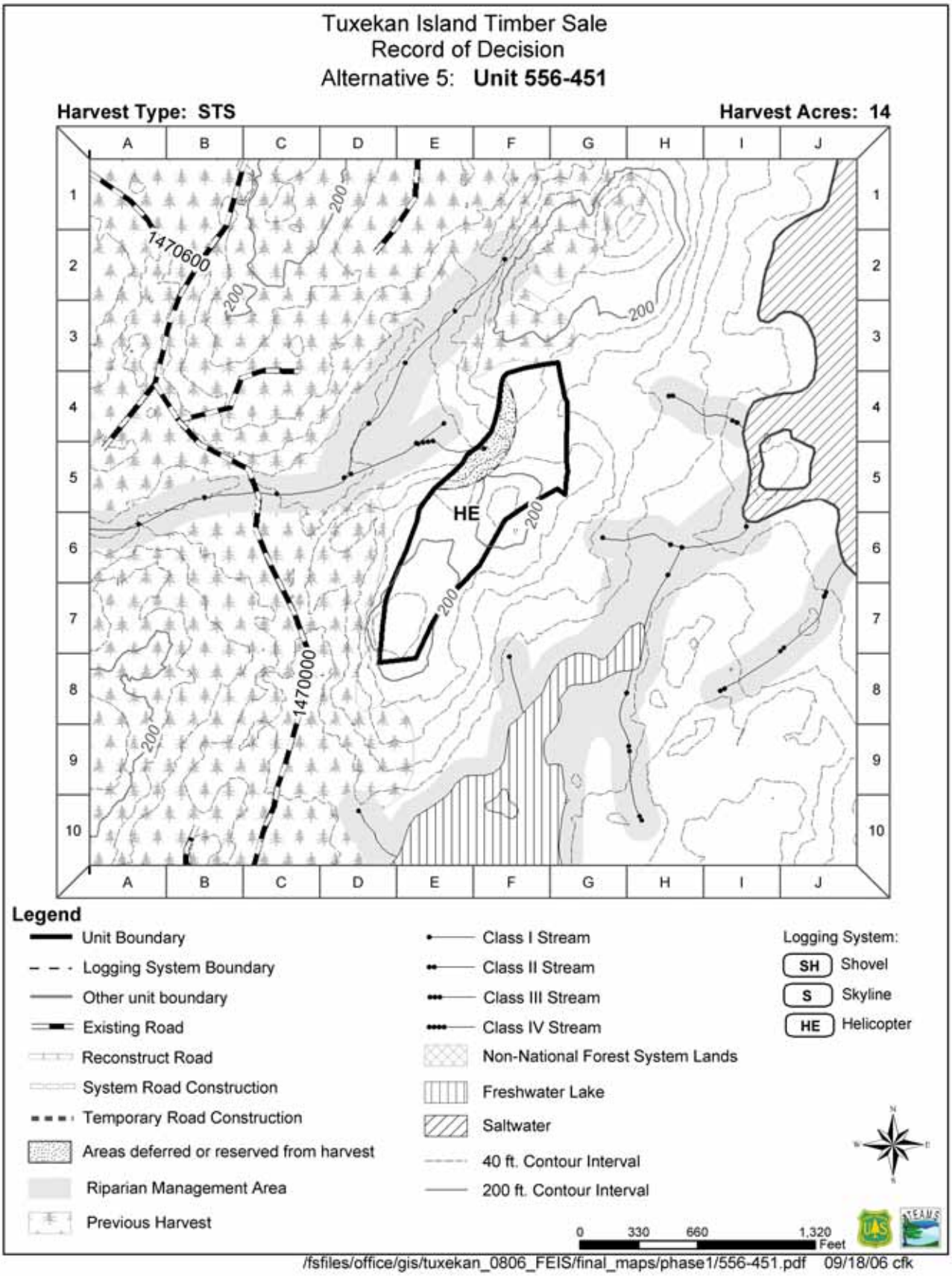
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 556-451 **Quad Map:** Craig D-4 **Photo #:** 00-11-10 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume:** **Alt 5:** 204
Total Planned Acres:25 **Harvest Acres:** **Alt 5:** 14

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 25 **Slopes >72% harvest:** 0
Streams **Class I:** 1 **Class II:** 0 **Class III:** 0 **Class IV:** 1

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is three. Minimum partial suspension for entire unit due to MMI rating. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.

Plant Association: 110 **Forested wetland (%area):**0
Soil Type: 40DEX (80%), 442CE (20%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter logging to Road 1470000 (1,000 feet W of the unit). Partial log suspension required (BMP 13.9).

Engineering

N/A

Fish/Watershed
ADF&G catalogued stream # 103-90-10895 is located downstream of the north western edge of this unit. Coho and pink salmon are present.
Loc: D-E5 Stream 1: PA1/I requires no cut RMA buffer of 100' plus RAW 75'; This stream is located outside of the northwestern unit boundary.
Loc: E-F5 Stream 2: MM1/IV no RMA buffer; Yard away from stream to reduce slash
Identify and flag Class IV stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 14 acres; No Cut Area 11 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit overlooks Jinhi Bay. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Unit is also visible in the background from Viewpoint 2 (Jinhi Bay). Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability

areas to protect shallow mineral and organic soils. Several areas of high vulnerability karst were discovered during inventory and unit layout. These areas were in the south end and eastern portions of the unit and have been removed from the unit. They consisted of cliffs and deeper epikarst. Timber is not to be harvested on, above, or below the cliffs. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
High windthrow hazard. Small scale gaps throughout stand indicate stem snap and/or small group windthrow events. Single tree selection –This treatment will likely result in the removal of about 6 trees per acre, most of which will be the tallest spruce. Some damage to the residual stand will be unavoidable. Harvest spruce 20 inches and greater and other species (species and diameter classes to be refined during layout), up to 25% of the basal area (245 sq ft). Designate reserve trees of sufficient size and condition to meet Marten/Goshawk S&Gs. Protect residual stand and advanced reproduction as much as possible. Leave all Alaska yellow cedar that meets safety reserve tree guides. This sets up an uneven-age management plan, with expected re-entries on a 50-year cycle, with approximately 25% basal area removal at each entry

Alternative 5: Single Tree Selection by Helicopter

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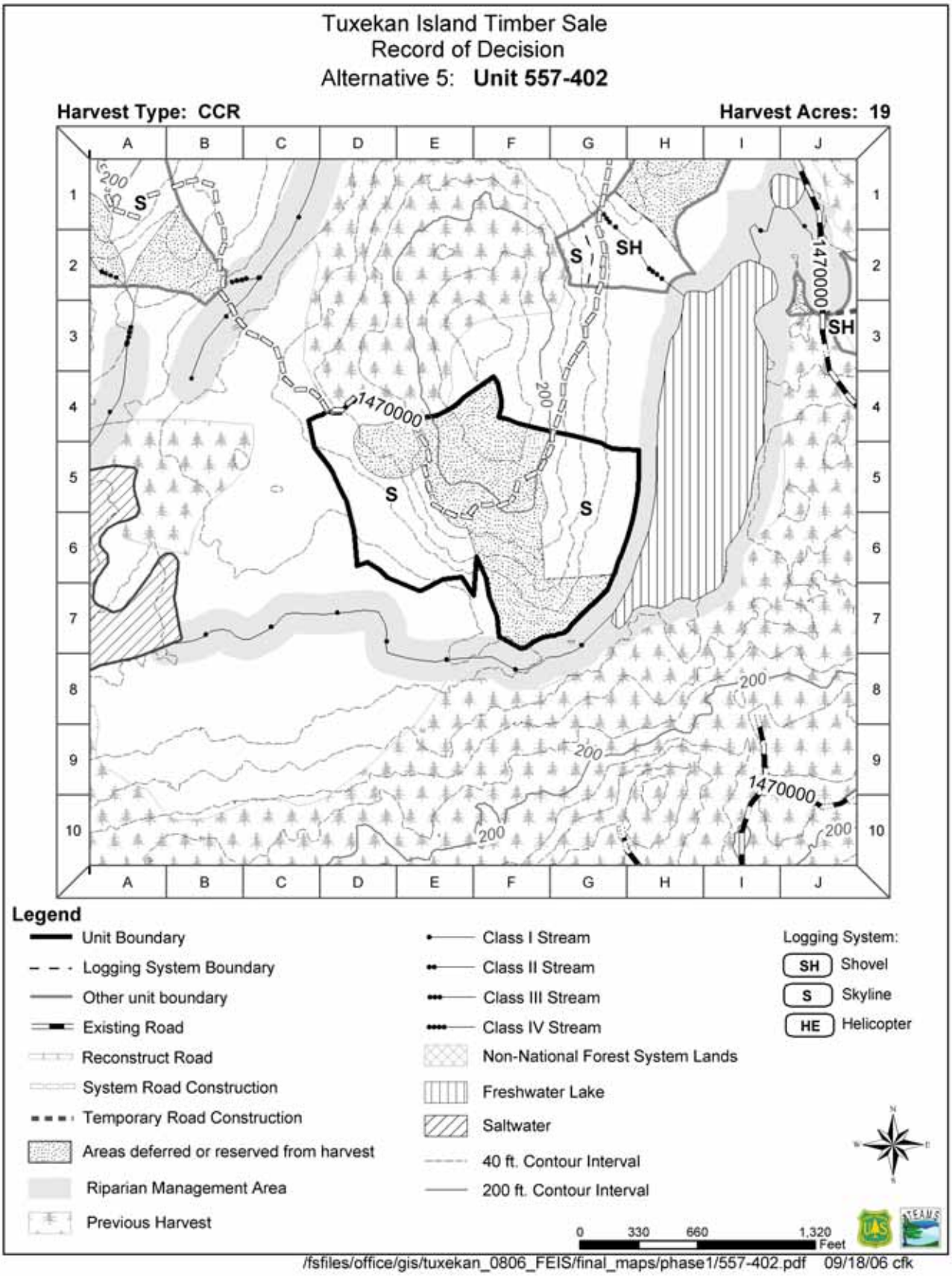
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-402 Quad Map: Craig D-4 **Photo #:** 00-11-13 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume:** **Alt 5:** 347
Total Planned Acres:38 **Harvest Acres:** **Alt 5:** 19

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 9 **High:** 28 **Slopes >72% harvest:** 0
Streams **Class I:** 1 **Class II:** 0 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 40 to 65% with small, isolated, steeper sections. The soil on the slopes in the unit appears relatively stable with no evidence for slope stability concerns. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19. and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (99%), 21A (1%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Tailtrees required; stump tailholds may be located in the lake/stream buffer where tailtrees are unavailable along south and southwest boundary. Partial log suspension required (BMP 13.9).

Engineering
Pre-haul maintenance required on 1.2 miles of 1470000 road. Construction of extension to 1470000 road required.

Fish/Watershed
There is an anadromous lake located along the eastern border of the unit that requires a 100’ no-cut RMA buffer and a feathered 100’ RAW buffer.
Loc: G-F7 Stream 1: PA5/I The outlet of the stream, that flows west from the lake also requires a 100’ no-cut RMA buffer and a feathered 100’ RAW buffer.
Identify and flag Class I stream during layout. BMPs include 12.6, and 12.6a.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. High Value Habitat - Deer: Harvest Area 18 acres; No Cut Area 18 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place located near Cap Island and Shikat Point. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with areas of low vulnerability where glacial till is thickest.

Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. Several areas of high vulnerability karst were discovered during inventory and unit layout. These areas were on the ridge top running through the central portion of the unit. These areas have been removed from the unit. The specified road accessing the unit has been located to avoid blasting and the 30-40% gradients on moderate vulnerability karst. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Moderate windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 185 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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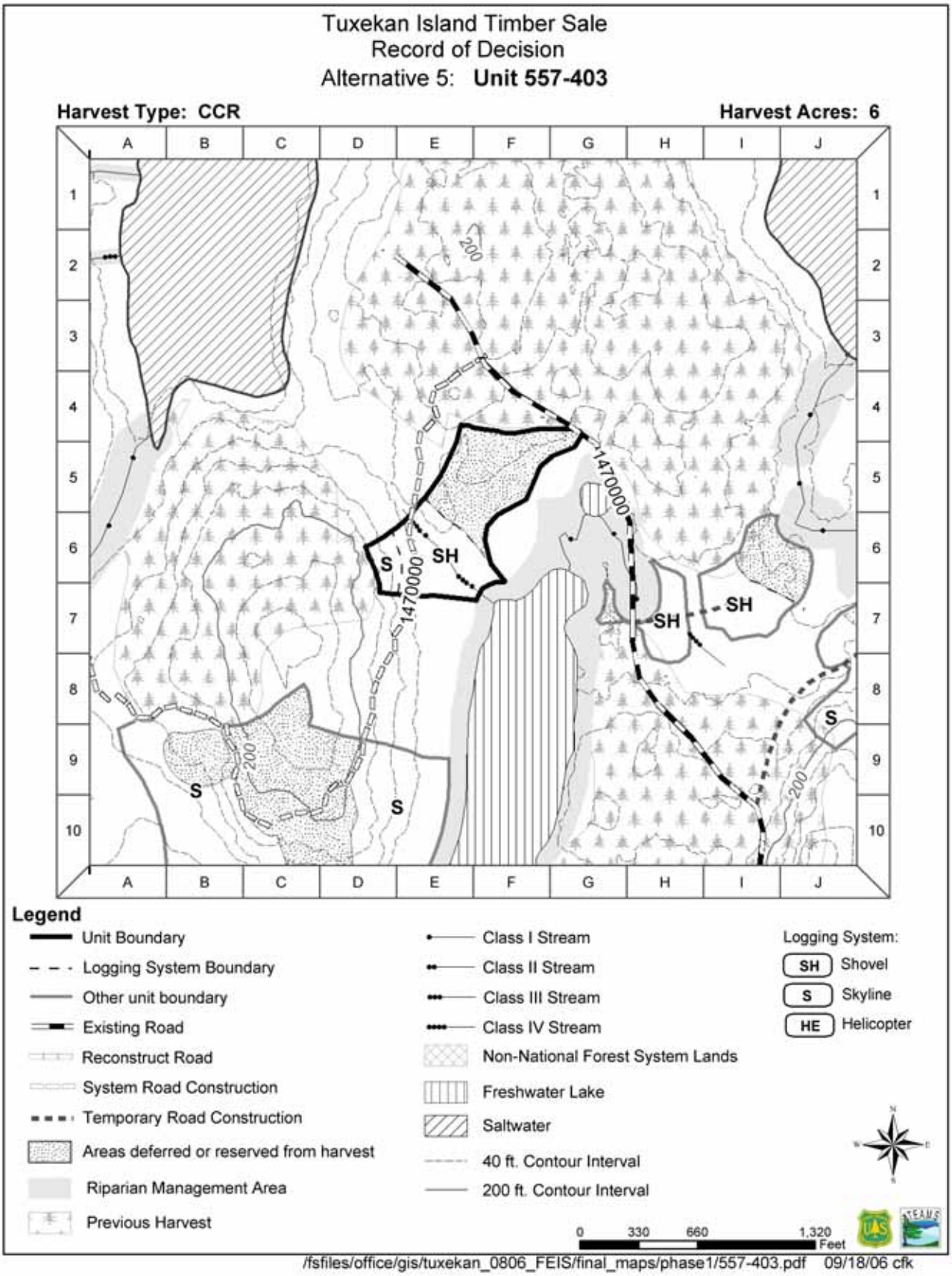
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-403 Quad Map: Craig D-4 **Photo #:** 00-11-13 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 233
Total Planned Acres:13 **Harvest Acres: Alt 5:** 6

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 13 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 0 **Class III:** 0 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 40 to 65%. The soil on the slopes in the unit appears relatively stable with no evidence for slope stability concerns. No wetlands present. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. Partial suspension required to protect soil and Class IV stream. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable and shovel yarding. Avoid landing location within karst feature buffer in the NW portion of the unit.

Engineering
Pre-haul maintenance required on 1.2 miles of 1470000 road. Construction of extension to 1470000 road required.

Fish/Watershed
There is an anadromous lake located along the eastern border of the unit that requires a 100' no-cut RMA buffer and a feathered 200' RAW buffer
Loc:D-E6 Stream 1: PA5/IV. No RMA buffer; Yard away from stream to reduce slash
Identify and flag Class IV stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 6 acres; No Cut Area 7 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place near Cap Island and Shikat Point. Established subsistence recreation use occurs within the project area. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is of moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to

protect shallow mineral and organic soils. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Moderate windthrow hazard. Small scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 335 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline and CCR by Shovel

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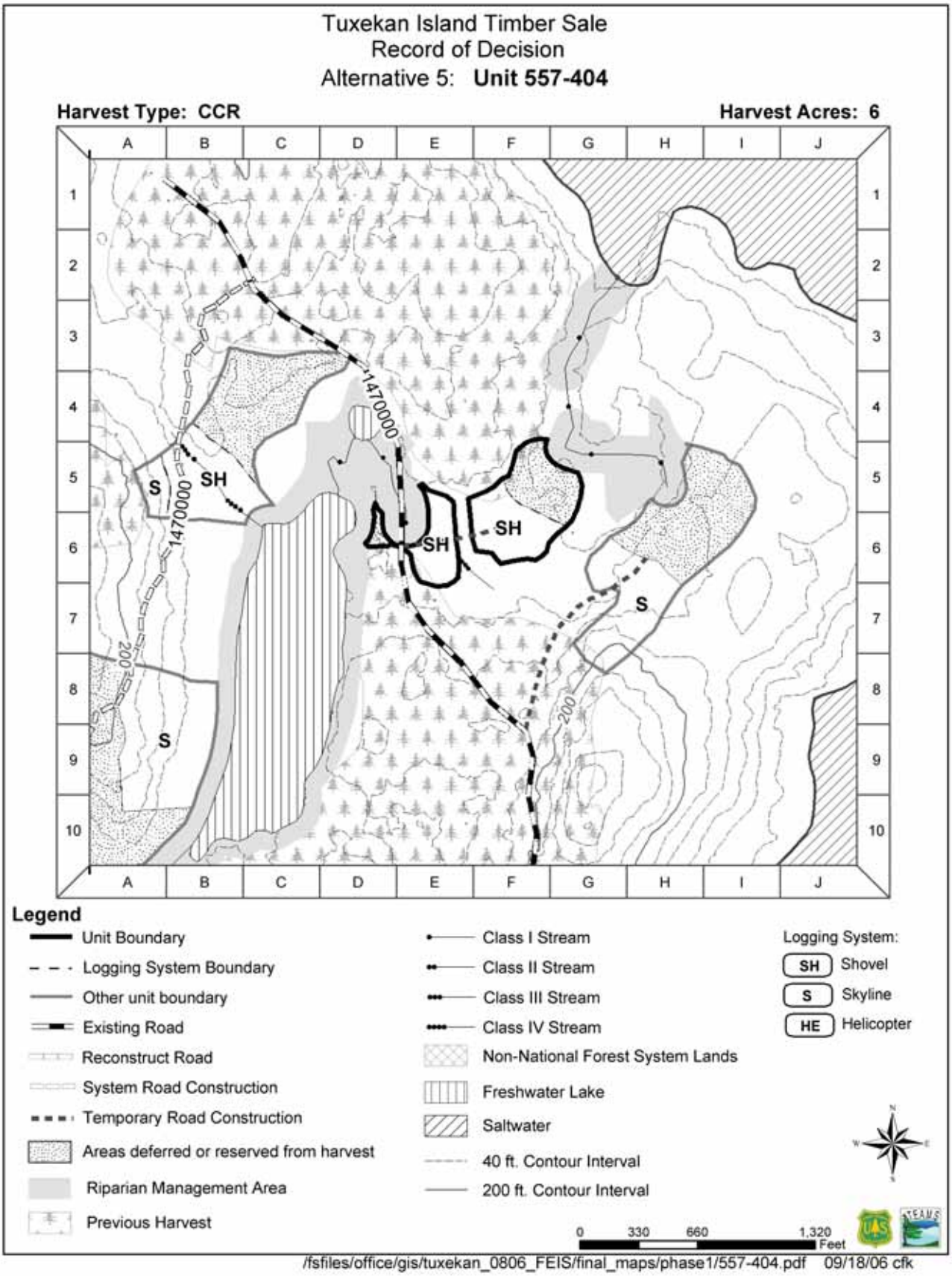
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-404 Quad Map: Craig D-4 **Photo #:** 00-11-13 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 97
Total Planned Acres:12 **Harvest Acres: Alt 5:** 6

Forest Type: Western Hemlock & Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 4 **High:** 7 **Slopes >72% harvest:** 0
Streams Class I: 1 **Class II:** 0 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 40 to 65%. The soil on the slopes in the unit appears relatively stable with no evidence for slope stability concerns. Forested wetlands were observed in the unit. Avoid forested wetlands during road construction if possible. (BMP 12.5). Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 19% (2.3 acres)
Soil Type: 442CE (72%), 220C (26%), 26A (2%) **Non-forested wetland (%area):** 0

Timber Input:
Shovel logging. Partial log suspension required (BMP 13.9). Approximately 700 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on .9 miles of 1470000 road.

Fish/Watershed
Lakes that flow directly into the ocean border the west boundaries of this unit. Streams are labeled from the west to east.

Loc: D5 Stream/Lake 1: PA5/I portion requires no-cut RMA buffer: 100’ plus RAW 75’, located on western border.

Loc: E5 Stream 1.1 MM1/I portion requires no-cut RMA buffer: 120’ plus RAW 75’, located just west and east of FSR 1470-000.

Loc: G5 Stream/Lake 1.2: PA5/I requires no-cut RMA buffer: 100’ plus RAW 75’. Located on eastern border.

Identify and flag Class I stream during layout. BMPs include 12.4, 12.5, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. MA in the western portion of the unit is also counted as reserve area. According to TPIT guidelines, RMAs along Class I and II streams that protrude into timber harvest units as peninsulas can contribute to marten and goshawk Standards and Guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. High Value Habitat - Deer: Harvest Area 2 acres; No Cut Area 5 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place located near Cap Island and Shikat Point. Established subsistence recreation use occurs within the project area. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with small areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. GIS mapping initially indicated the possible presence of an insurgence along the southeastern most boundary of the unit where a Class-4 stream appears to go underground. No such feature or stream was discovered during unit layout. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Moderate windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Some windthrow occurred following logging of adjacent stands to the south. Basal area is 210 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Shovel

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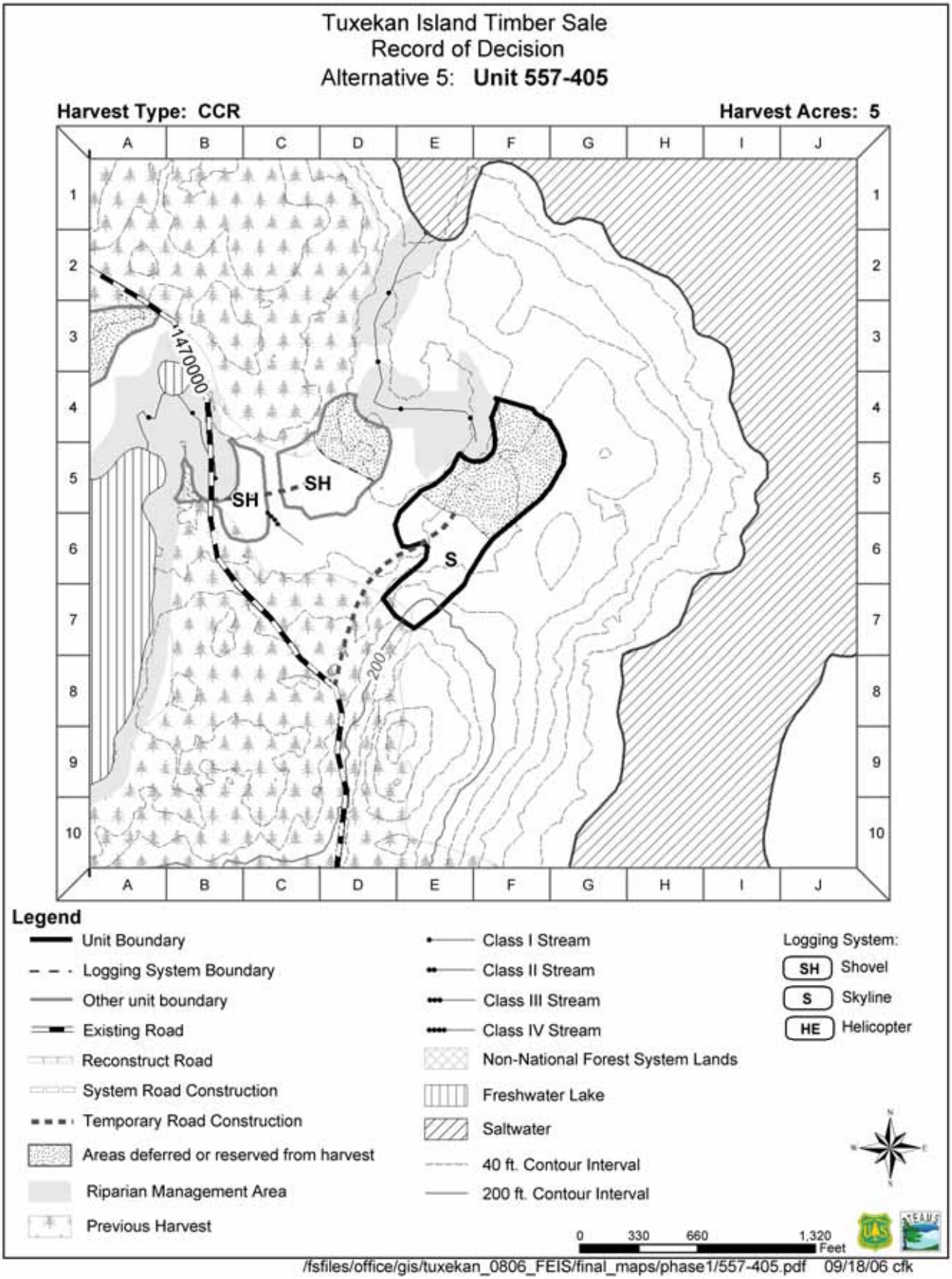
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-405 Quad Map: Craig D-4 **Photo #:** 00-11-13 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 243
Total Planned Acres:13 **Harvest Acres: Alt 5:** 5

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 13 **Slopes >72% harvest:** 0
Streams Class I: 1 **Class II:** 0 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 40 to 65%. The soil on the slopes in the unit appears relatively stable with no evidence for slope stability concerns. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 40DEX (19%), 442CE (79%), 26A (3%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Approximately 1200 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on .6 miles of 1470000 road.

Fish/Watershed
One stream defines the northern boundary and flows north into the ocean.
Loc: F5 Stream 1: PA1/I requires no-cut RMA buffer: 100' plus RAW 75'.
Identify and flag Class I stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. RMA in the northern portion of the unit is also counted as reserve area. According to TPIT guidelines, RMAs along Class I and II streams that protrude into timber harvest units as peninsulas can contribute to marten and goshawk Standards and Guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 5 acres; No Cut Area 8 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place locate near Cap Island and Shikat Point. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Unit is also visible in the background from Viewpoint 2 (Jinhi Bay). Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with small areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 260 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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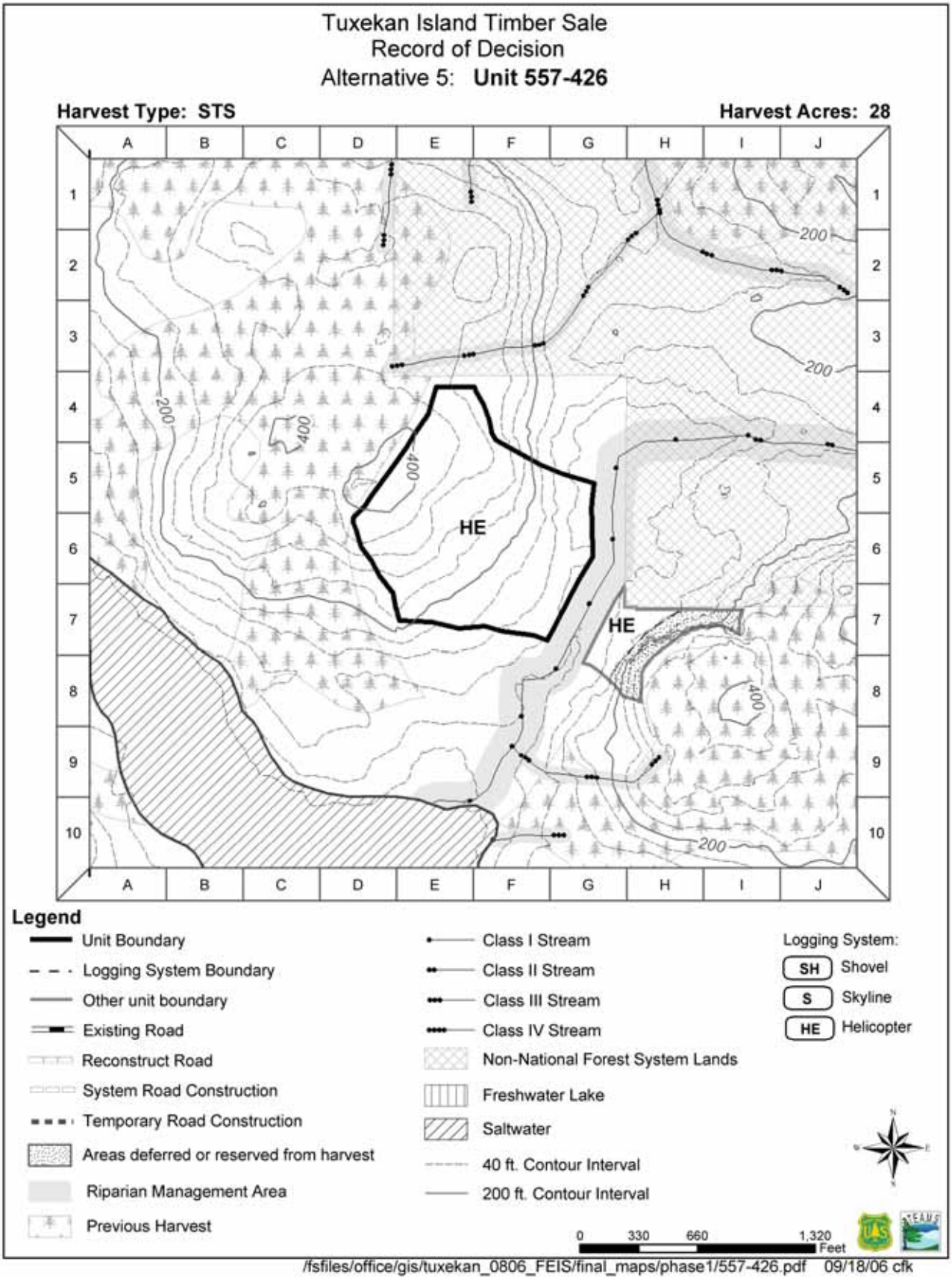
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-426 Quad Map: Craig D-4 **Photo #:** 00-12-11 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 293
Total Planned Acres:29 **Harvest Acres: Alt 5:** 28

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 29 **Slopes >72% harvest:** 1
Streams Class I: 1 **Class II:** 0 **Class III:** 1 **Class IV:** 0

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22

Plant Association: 110 **Forested wetland (%area):**0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter logging to road 1470020 (2,500 feet SE of the unit). Partial log suspension required (BMP 13.9).

Engineering

Pre-haul maintenance required on .2 miles of 1470020 road.

Fish/Watershed
A Class I stream borders the eastern boundary of this unit and flows directly into the ocean.
Loc: G5-7 Stream 1: PA5/I requires no-cut RMA buffer: 100'. No RAW buffer is listed since 75 to 80% of the trees would be retained.
Loc: E-F4 Stream 2: HC6/III requires an RMA buffer defined as V-notch (side-slope break). No RAW. This stream runs west to east just north of the northern boundary.
Identify and flag Class I stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Single Tree Selection with more than 50% of canopy retained meets marten and goshawk standards and guidelines to maintain an average canopy closure of >/=30%. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 28 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: Unit borders state land on 2 sides. No private or encumbered lands are located near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Unit has moderately vulnerable karst. The unit will be partially cut using a helicopter. This prescription and logging method will adequately meet the partial suspension requirement for moderately vulnerable karst. If additional significant features are identified during unit layout, the Forest service Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:

High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Some windthrow on clearcut edges. Single tree selection will result in the removal of about 20 trees per acre leaving a residual stand containing 187 BA, and (approximate). Harvest hemlock 20 to 29 inches and redcedar 20 inches and greater (species and diameter classes to be refined during layout), up to 25% of stand basal area (total is 250 sq ft per acre). Harvest trees heavily infested with dwarf mistletoe. Designate reserve trees of sufficient size and condition to meet Marten/Goshawk S&Gs. Protect residual stand and advanced reproduction. Leave all Alaska yellow cedar that meet reserve tree guides. This sets up an uneven-age management plan, with expected re-entries on a 50-year cycle, with approximately 25% basal area removal at each entry.

Alternative 5: Single Tree Selection by Helicopter

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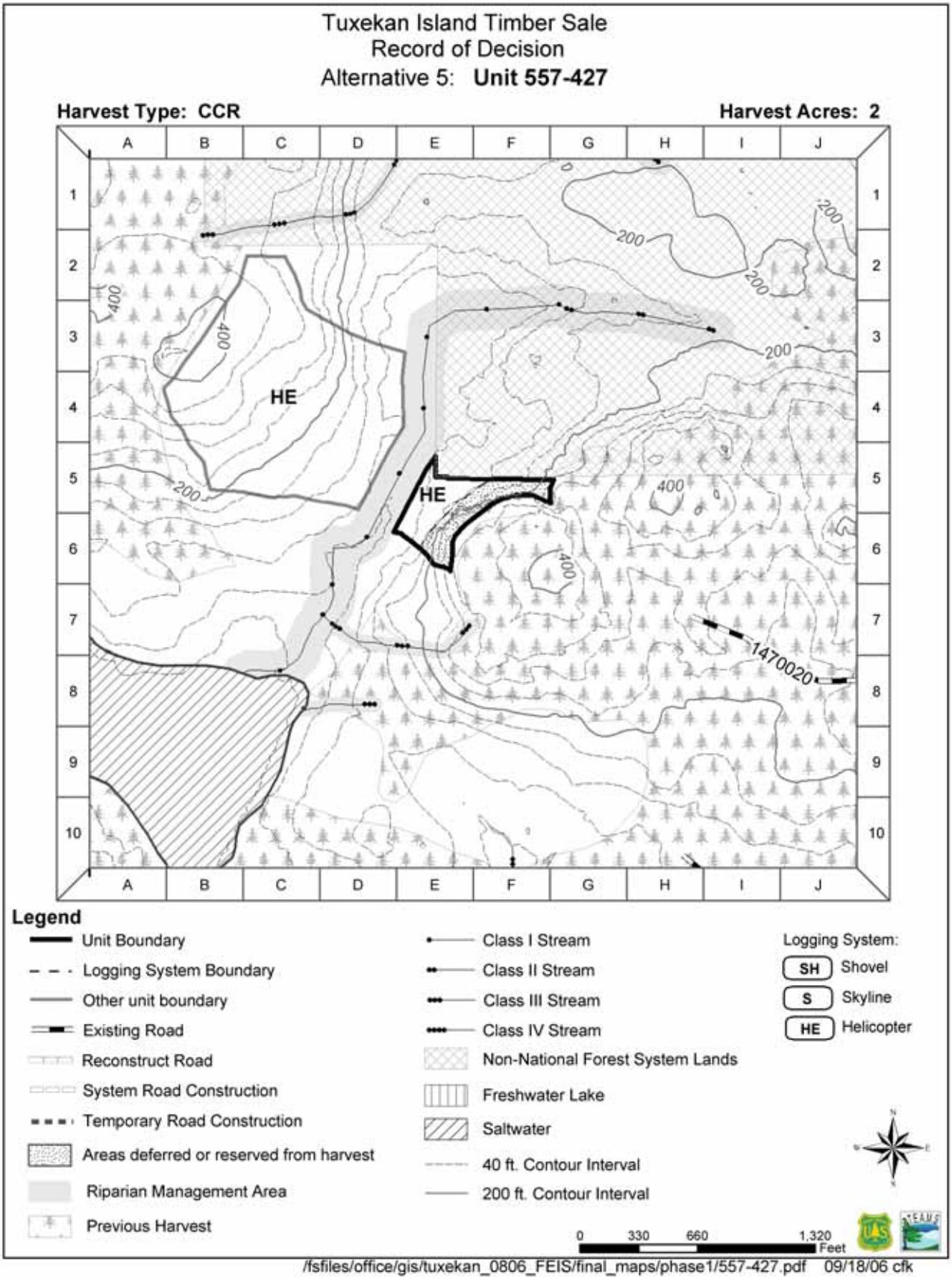
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-427 Quad Map: Craig D-4 **Photo #:** 00-12-11 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 58
Total Planned Acres: 4 **Harvest Acres: Alt 5:** 2

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 4 **Slopes >72% harvest:** 2
Streams Class I: 1 **Class II:** 0 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes within the unit are variable with 1.8 acres identified as greater than 72%. The mass movement index (MMI) for the entire unit is two. Minimum partial harvest in areas greater than 72% slope to minimize soil displacement. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, 14.22.
Plant Association: 720 **Forested wetland (%area):** 0
Soil Type: 40DEX (2%), 442CE (98%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter logging to road 1470020 (1,500 feet SE of the unit). Partial log suspension required (BMP 13.9).

Engineering

Pre-haul maintenance required on 0.2 miles of 1470020 road.

Fish/Watershed
One Class I stream is located along the western boundary of the unit.
Loc: D5 Stream 1: PA5/I requires no-cut RMA buffer: 100'. Due to the small size of the unit and openings created with helicopter logging a RAW buffer is not assigned.
Identify and flag Class I stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. High Value Habitat - Deer: Harvest Area 2 acres; No Cut Area 2 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Unit is also visible in the background from Viewpoint 2 (Jinhi Bay). Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: Unit borders state land. No private or encumbered lands are located near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Moderate karst vulnerability (per Forest Service Geologist and 1995 Karst Vulnerability Report (Harza 1995)). Minimum partial log suspension in moderate karst vulnerability areas to protect exposed epikarst. If significant features are identified during unit layout, the Forest Service Geologist should be

contacted to determine appropriate mitigative measures. BMPs include 13.3 and 14.19.

Silvicultural Input:
Moderately high windthrow hazard. Small scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 150 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.
Alternative 5: CCR by Helicopter

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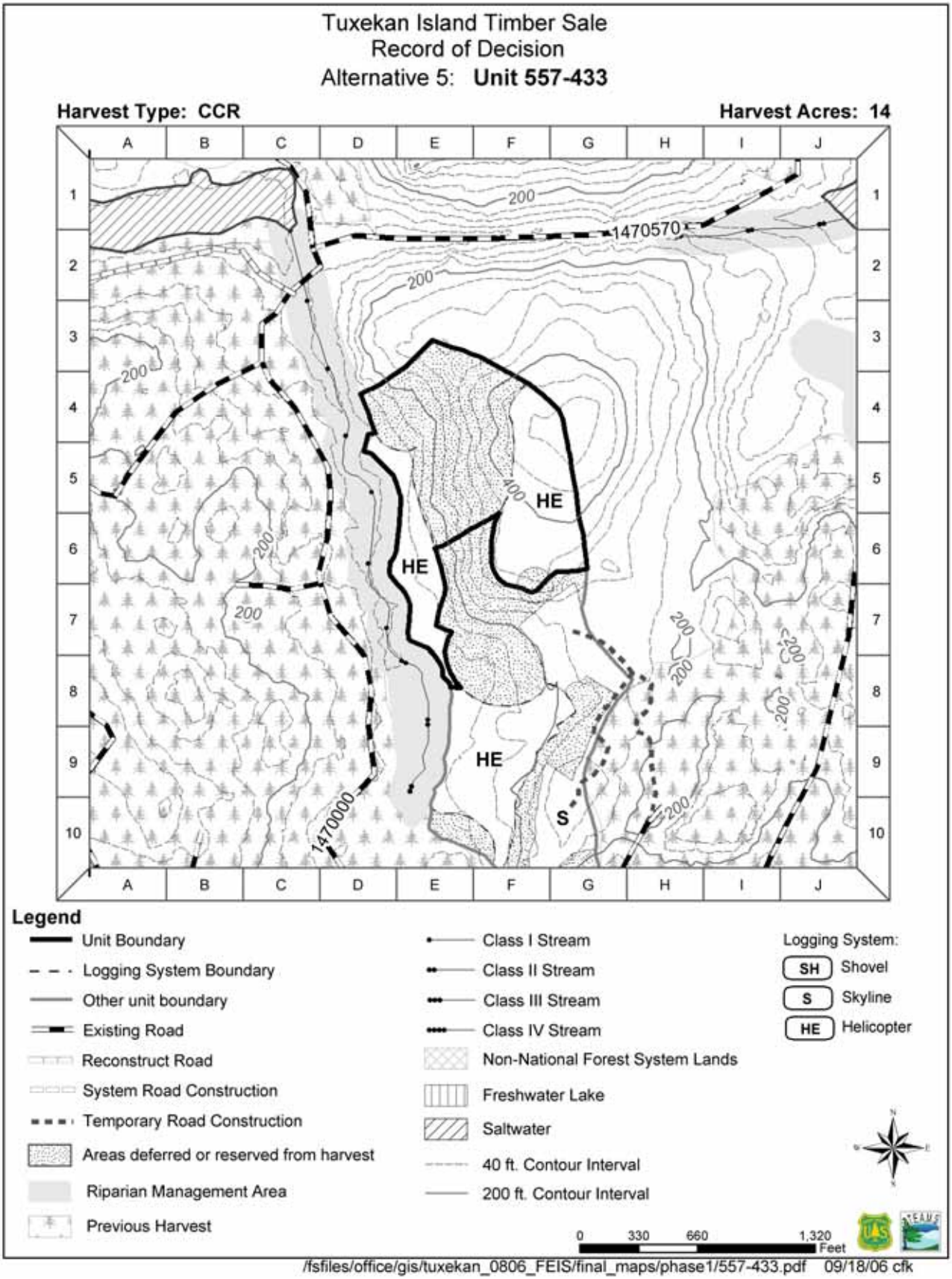
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 557-433 Quad Map: Craig D-4 **Photo #:** 00-11-8 **WAA:** 1531
Alternatives: 3, 4, 5 **Estimated Volume: Alt 5:** 634
Total Planned Acres:64 **Harvest Acres: Alt 5:**14

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 63 **Slopes >72% harvest:** 3
Streams Class I: 1 **Class II:** 1 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65%. Steep slopes as high as 90-100%+ and subvertical cliff bands were found in the middle portion of the unit. The soil on the slopes in the unit appears relatively stable. The soils on the steep slopes in the central portion of the unit were organics overlying limestone with very little soil development. With very shallow soils, there was no specific indication of slope instability observed in the unit. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 0
Soil Type: 40DEX (74%), 442CE (26%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter logging to road 1470000 (1,500 feet SW of the unit). Partial log suspension required (BMP 13.9).

Engineering

N/A.

Fish/Watershed
ADF&G catalogued stream #103-90-10980 is located on the western border of this unit. Coho salmon are present and rear within this system. The one Class I/II stream has three channel types:

Loc: D4 Stream 1: MC2 portion of the Class I stream requires no-cut RMA buffer: 100’ plus RAW 75’, This portion of the stream is located on the northern 1/3 of the unit on western boundary.

Loc: D5 Stream 1: MM2 portion of the Class I stream requires no-cut RMA buffer: 120’ plus RAW 75’.

Loc: D6-9 Stream 1: PA5 portion of the Class I/II stream requires no-cut RMA buffer: 100’ plus RAW 75’. This portion of the stream is located in half-way through the unit along the south west boundary.

Identify and flag Class I/II stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 16 acres; No Cut Area 48 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place located near Scott Lagoon. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from Viewpoint 3 (Scott Lagoon). Prescription meets maximum modification VQO; no concerns. An opportunity to

enhance recreation exists at Scott Lagoon, where there are historic sites.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
High karst vulnerability (north)/Moderate karst vulnerability (elsewhere). One area of high vulnerability karst was discovered during inventory and unit layout and have been removed from the unit and/or buffered by a 100-foot no-harvest buffer plus wind firmness and slope break. No harvest in high karst vulnerability areas with 100-ft buffer plus windfirm around these areas. Minimum partial log suspension in east half to protect exposed epikarst. If significant features are identified during unit layout, the Forest Service Geologist should be contacted to determine appropriate mitigative measures. (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
High windthrow hazard. Small scale gaps throughout stand indicates stem snap and/or small group windthrow events. . Basal area is 335 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Helicopter

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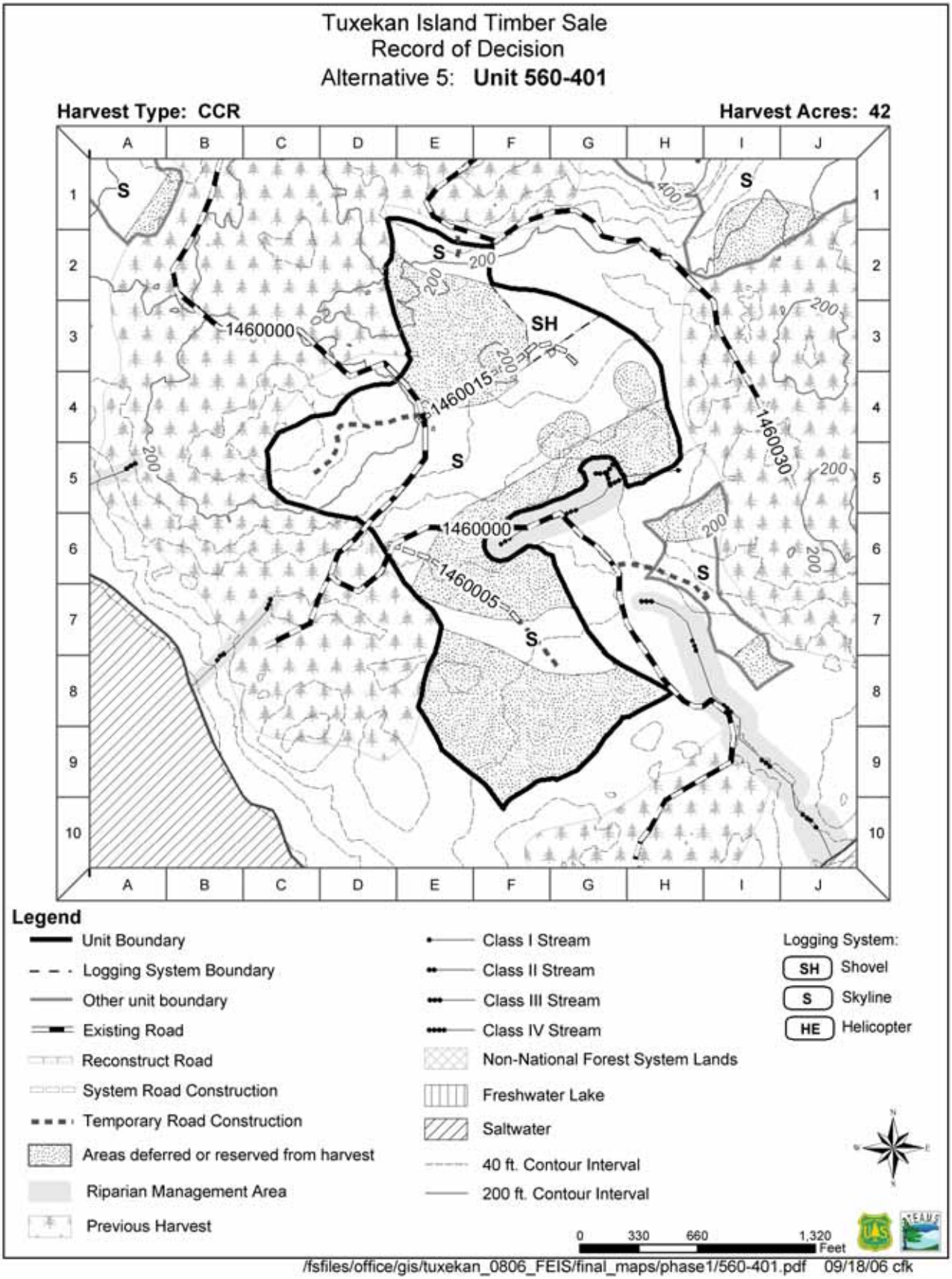
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-401 Quad Map: Craig D-4 **Photo #:** 00-12-3 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 1976
Total Planned Acres:84 **Harvest Acres: Alt 5:** 42

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 2 **High:** 81 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 2

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the southeast corner is one while the remainder is rated two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 40DEX (3%), 442CE (97%) **Non-forested wetland (%area):** 0

Timber Input:
Cable and shovel logging. Partial log suspension required (BMP 13.9). Approximately 1,375 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Construction of new 1460005 and 1460015 roads required.

Fish/Watershed
There is a small Class III in the middle of the unit with 2 Class IVs flowing into it.
Loc: F-G6 Stream 1: PA1/III RMA buffer is top of the V-Notch, plus additional RAW buffer of 25';
Loc: G5 Stream 1.1: MM1/IV; no RMA buffer; yard away from stream to reduce slash
Loc: H5 Stream 1.2: MM1/IV: no RMA buffer; yard away from stream to reduce slash
Identify and flag Class III and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, 13.16, and 14.14.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 42 acres; No Cut Area 42 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with small areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. Several areas of high vulnerability karst were discovered during inventory and unit layout and have been removed from the unit and/or buffered by a 100-foot no-harvest buffer plus wind firmness and slope break. In the FEIS the NFS road to access the landing in the northeastern portion of the unit has been relocated southward to the ridge top to avoid closed basin to the north. Unit contains 3 claim corners for mining claims that need to be protected. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Significant portions of the two northern most settings are even aged mature timber which probably originated from a fairly large wind event (this area is heavily impacted by karst and associated buffers). This part should be considered highly susceptible to windthrow. The remainder of the unit contains small to medium scale gaps more typical of small scale wind events. This area is not as susceptible to windthrow, although the position of the entire unit relative to the ocean makes it susceptible. Basal area is 260 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline and CCR by Shovel

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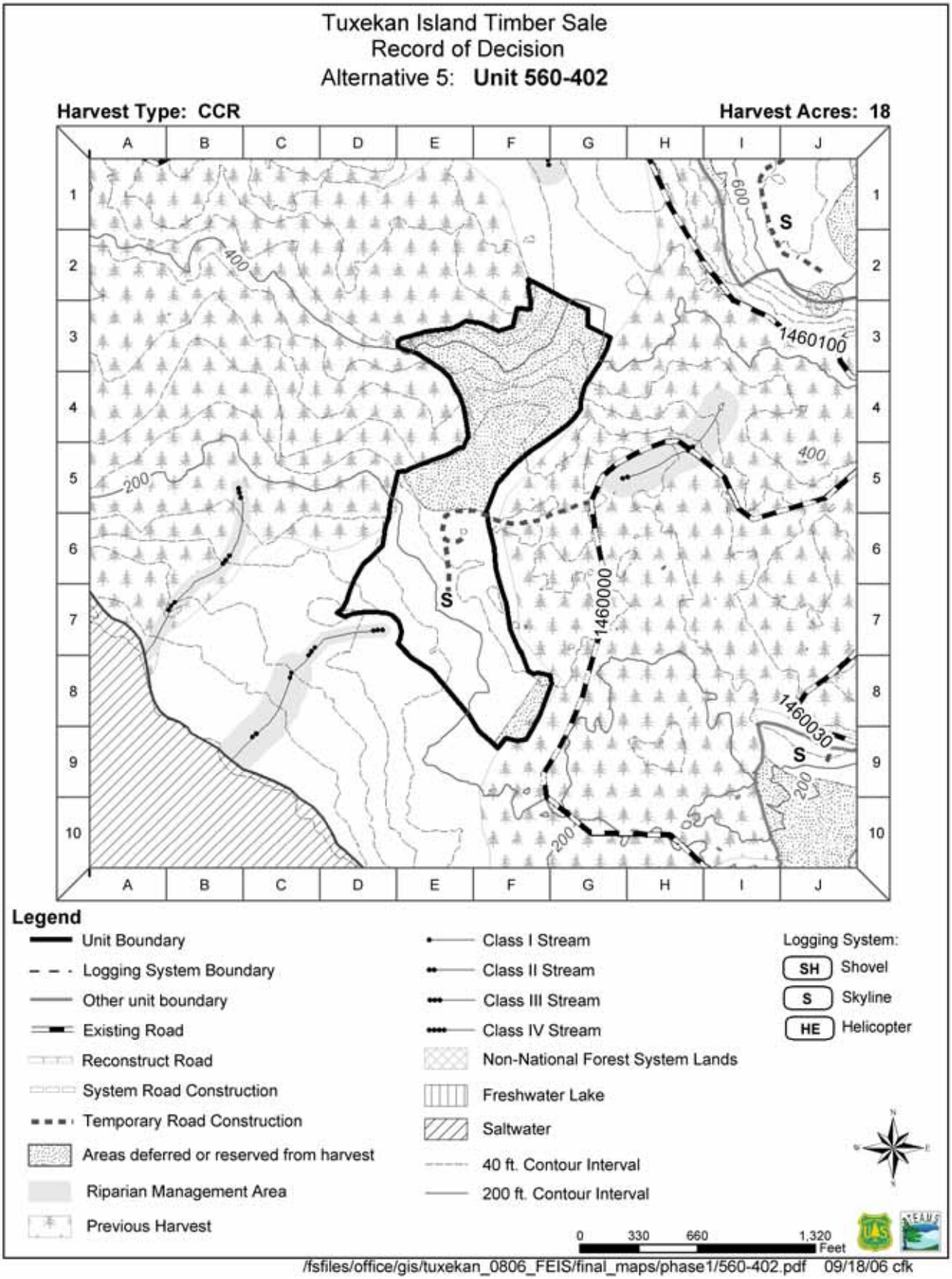
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-402 Quad Map: Craig D-4 **Photo #:** 00-11-2 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 771
Total Planned Acres:36 **Harvest Acres: Alt 5:**18

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 34 **Slopes >72% harvest:** 1
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 0

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.

Plant Association: 710 **Forested wetland (%area):**0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Approximately 1500 feet of temporary road, with some blasting required. Northern half of unit laid out for cable logging but excluded due to karst. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
N/A

Fish/Watershed
One small Class III stream is located just outside of the middle west unit boundary.
Loc: D7 Stream 1: HC2/III requires RMA buffer defined as the V-notch (side-slope break), plus 25' RAW buffer.
Identify and flag Class III stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 17 acres; No Cut Area 19 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with small areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. Several areas of high vulnerability karst were discovered during inventory and unit layout. Unit boundary was modified to protect those features. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:

Very high windthrow hazard. Southern 2/3 of the unit is even age, mature timber that probably originated from a large wind event. The remainder contains small to medium scale gaps more indicative stem snap and/or small group windthrow events. Feather the north and northwest boundaries to reduce windthrow potential of adjacent stands. Basal area is 285 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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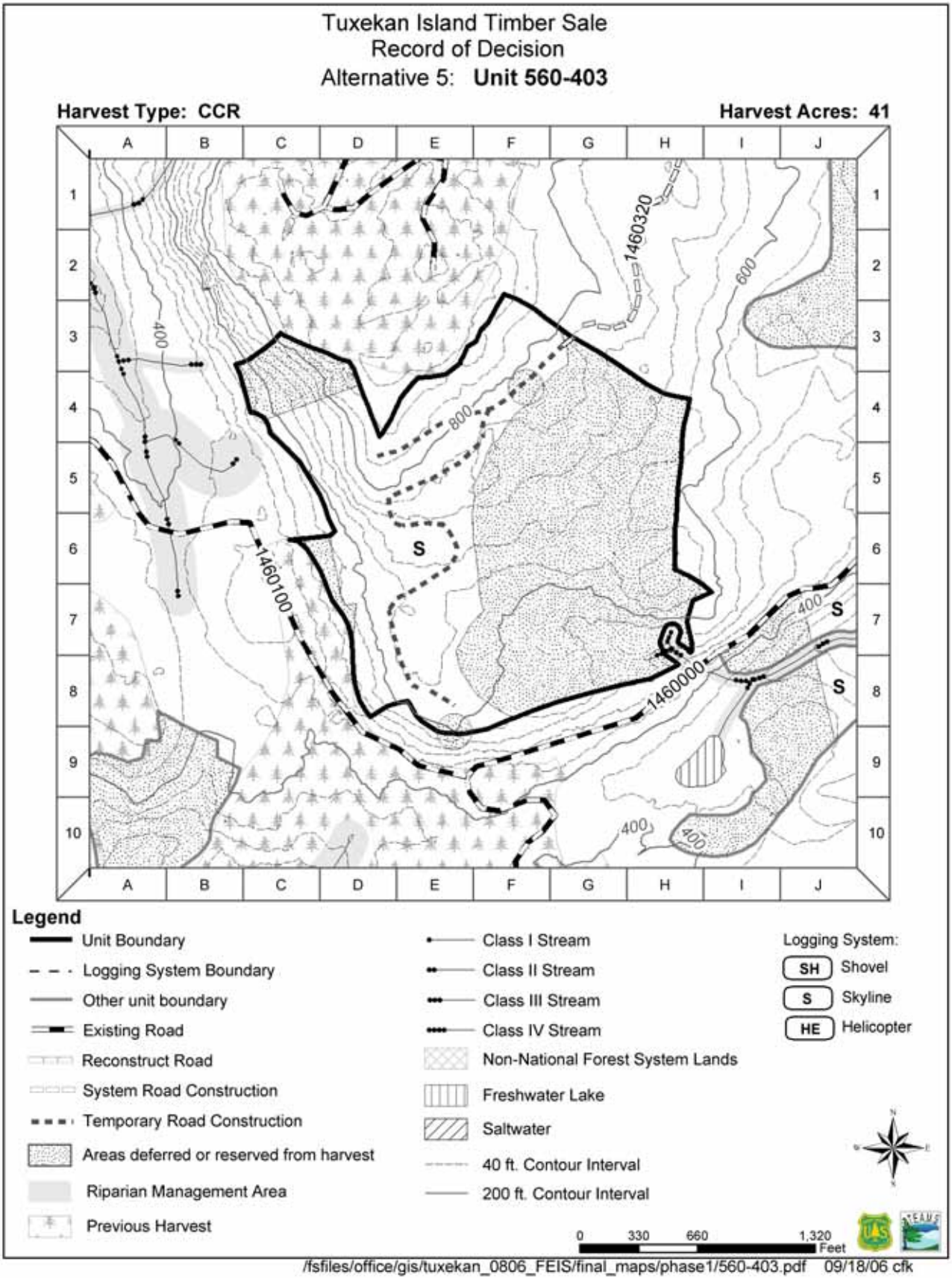
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-403 Quad Map: Craig D-4 **Photo #:** 00-12-4 **WAA:** 1531
Alternatives: 2, 3, 5 **Estimated Volume: Alt 5:** 1121
Total Planned Acres:93 **Harvest Acres: Alt 5:** 41

Forest Type: Western Hemlock-Poorly Drained, Western Hemlock and Redcedar-Well Drained
RMA (acres): 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 93 **Slopes >72% harvest:** 5
Streams Class I: 0 **Class II:** 1 **Class III:** 2 **Class IV:** 1

Soils Input:
Slopes in the unit ranged from 40 to 65%, with steep 90%+ and subvertical cliff bands in the northwest portion of the unit. The soil on the slopes in the unit appears relatively stable. Thin soils on the grikes systems in the eastern portion of the unit and the steep subvertical cliff bands in the northern portion of the unit may be of concern for maintaining subsurface flow patterns into the grike systems and regeneration. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were not observed in the unit; no concerns. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 40DEX (75%), 442CE (25%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Approximately 3,800 feet of temporary road, grades to 16% adverse. East half of unit laid out for cable logging but excluded due to karst. Leave timber on 72% slope below landing and cut corridors through the steep area for yarding timber below the steep area. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Construction of new 1460320 road required.

Fish/Watershed
There are a few small streams outside the boundary of this unit.

Loc: B3 Stream 1: HC6/III requires RMA buffer defined as the V-notch (side-slope break), plus 25' RAW buffer; This stream is located just outside of the northwest boundary.

Loc: B5 Stream 2: AF2/II requires no-cut RMA buffer: 140', plus RAW 75'. This stream is located outside western boundary, north of FSR 1460-100.

Loc: H8 Stream 3: HC5/III requires RMA buffer defined as the V-notch (side-slope break), plus 25' RAW buffer

Loc: H8 Stream 3.1: HC2/IV no RMA buffer; yard away from stream to reduce slash

Identify and flag Class III and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, and 13.6.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 41 acres; No Cut Area 52 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and

Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Cliffs and windthrow in the northwest portion of the unit was deleted. Unit is moderate vulnerability karst and will require partial suspension in order to protect the karst. There is adjacent high vulnerability karst. If additional significant features are identified during unit layout, the Forest service Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). The temporary road associated with this unit has been proposed for relocation. It has not yet been approved by the Forest Geologist. It should be moved as far north as practical to minimize impacts to the high vulnerability karst feature (Baichtal, 2005c). For these temporary roads: ensure that road drainage is designed such that sediment is deposited prior to entry into surface waters and that no road associated drainage empties directly into any karst feature (BMP 14.3, SGVA8); No karst features will be used for construction or logging debris disposal (SGVA2, 7, 8; BMP 14.10, 14.19); any culverts needed will be designed under the guidelines of BMP 14.17 to ensure adequate design; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures should be installed and maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:

High windthrow hazard. Roughly half of the unit is mature timber which probably originated from a fairly large scale wind event. The remainder contains small scale gaps indicative of stem snap and single tree or small group windthrow events. Basal area is 260 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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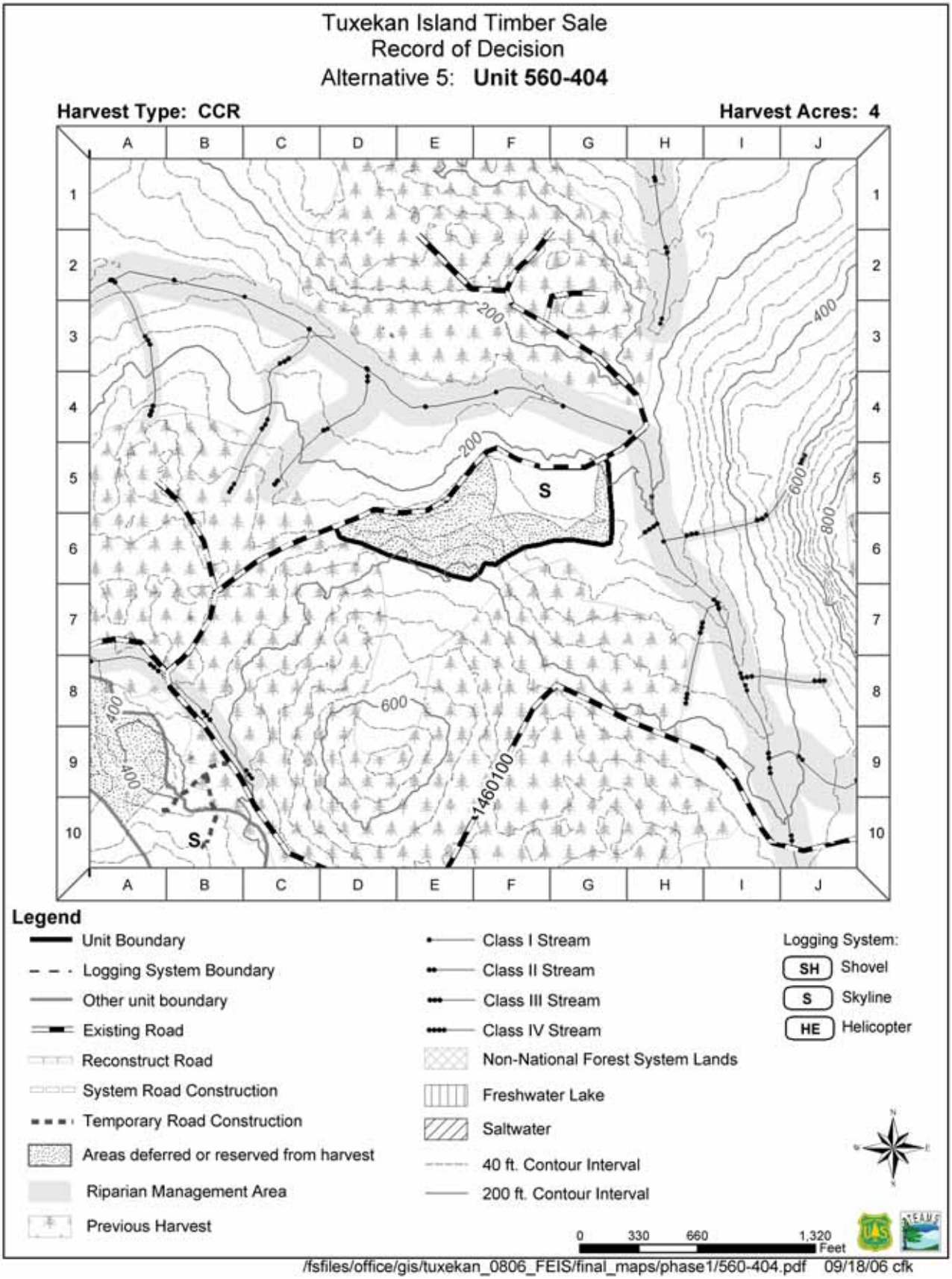
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-404 Quad Map: Craig D-4 **Photo #:** 00-11-3 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 119
Total Planned Acres:14 **Harvest Acres: Alt 5:** 4

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 13 **Slopes >72% harvest:** 1
Streams Class I: 1 **Class II:** 1 **Class III:** 0 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 40 to 65%. Steep slopes as high as 90%+ were found on a steep cliff in the along the western boundary of the unit. The soil on the slopes in the unit appears relatively stable. The steep cliff bands in the western portion of the unit may be of concern for potential rock/landslide. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (99%), 220C (1%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Tailtrees required.

Engineering
N/A.

Fish/Watershed

Streams are located outside the north and eastern boundaries.

Loc: C5-D4 Stream 1: HC2/II requires no-cut RMA buffer 100', plus RAW buffer of 75'; This stream is located outside of the western boundary and flows into Stream 2.

Loc: D3-H6 Stream 2: MC1/I requires no-cut RMA buffer 100', plus RAW buffer of 75'; This stream is located outside of the northern boundary of the unit.

Loc: H6 Stream 3: MM1/IV no RMA buffer; yard away from stream to reduce slash. Small stream on the south eastern corner, flows into Stream 2.

Identify and flag Class I stream during layout.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 4 acres; No Cut Area 10 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the western portion of the unit removed and/or buffered with 100 ft buffer plus windfirm where appropriate. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Existing windthrow from adjacent harvest units on western edge. Basal area is 175 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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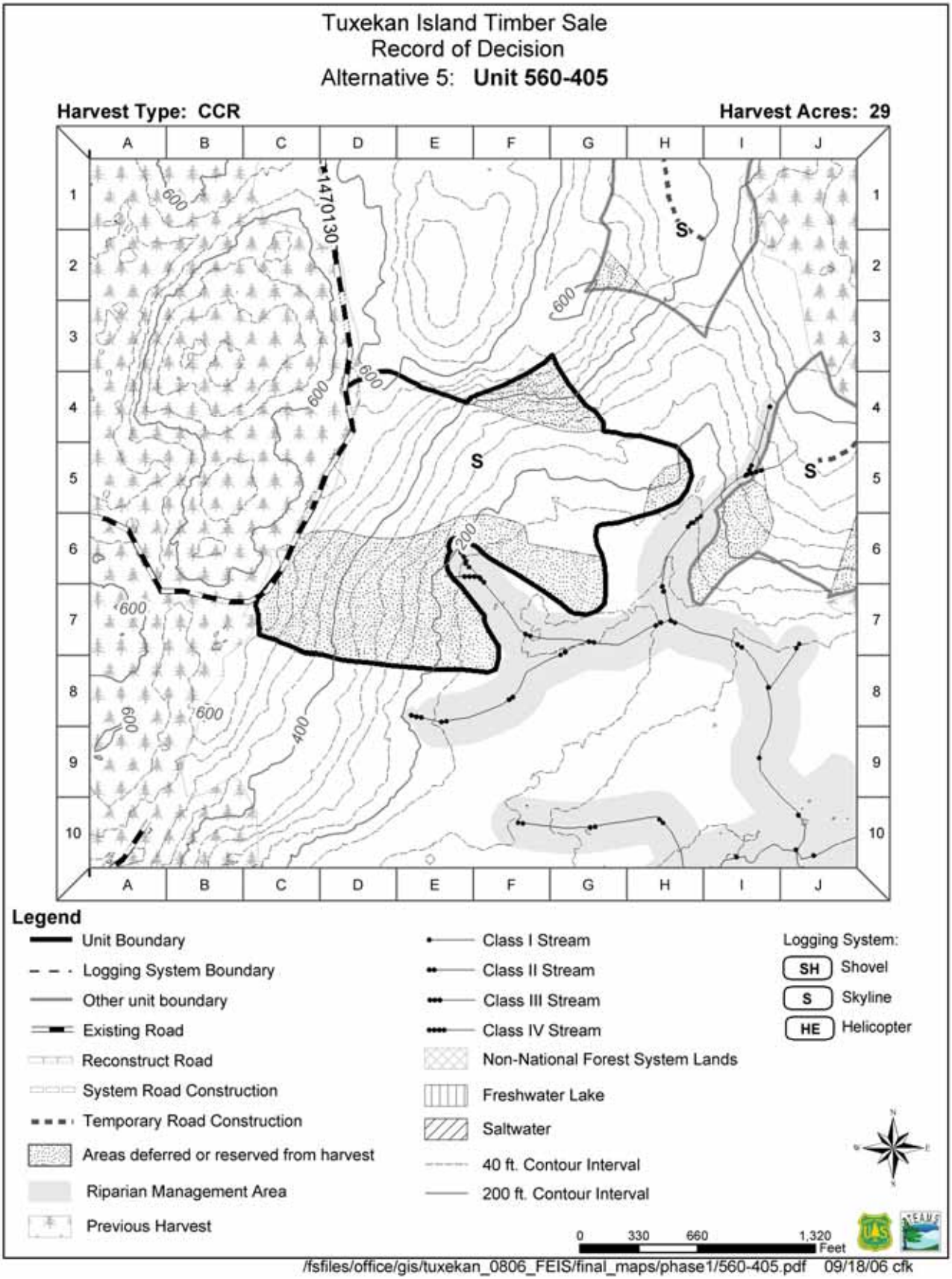
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-405 Quad Map: Craig D-4 **Photo #:** 00-12-7 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 791
Total Planned Acres:58 **Harvest Acres: Alt 5:** 29

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 3 **Medium:** 3 **High:** 50 **Slopes >72% harvest:** 3
Streams Class I: 0 **Class II:** 4 **Class III:** 3 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 40 to 65%. Steep slopes as high as 90%+ were found on several rock outcrops <2 acres in size. The soil on the slopes in the unit appears relatively stable. The soil on the steep slopes in the upper elevations consists of moss layers overlying limestone with very little soil development. There is evidence of small-scale soil creep due to shallow subsurface flows with minimal soil development along the hillslope; however, the shallow soils and undulating epikarst topography along this hillslope indicate stability against slope mass movement. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were observed in the southern portion of the unit. Avoid forested wetlands during road construction if possible (BMP 12.5. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.1, 12.4 12.6, 12.6a, 12.17, 13.5, 13.9, 13.10, 13.14, 14.5, 14.7, 14.8, 14.9, 14.20, 14.22

Plant Association: 710 **Forested wetland (%area):** 0.7% (0.4 acres)
Soil Type: 40DEX (5%), 442CE (89%), 220C (6%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Some rock bolt anchors may be required at Landing 2. Two short temporary spurs required, about 450 feet total. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
N/A.

Fish/Watershed
ADF&G catalogued stream #103-90-10960 is located downstream of this unit. Coho salmon are present and rear within this system. Three Class II streams run along the southeastern border of this unit, with Class III and IV streams in the headwaters.

Loc: E8 Stream 1: HC6/III portion of this stream requires an RMA buffer defined as the V-notch (side-slope break), plus 25' RAW buffer.

Loc: E8-H7 Stream 1: AF2/II portion of this stream requires a no-cut RMA buffer of 140', plus RAW buffer of 75'. This stream is located along the southern boundary.

Loc: E6 Stream 2: HC5/IV no RMA buffer; yard away from stream to reduce slash. This Class IV is a tributary to the second Class II stream located in the middle of the unit

Loc: E6 Stream 3: HC5/III portion requires an RMA buffer defined as the V-notch (side-slope break), plus 25' RAW buffer. This stream is the headwaters to the second Class II stream.

Loc: F7 Stream 3: PA5/II portion requires no cut RMA buffer: 100' plus RAW buffer of 75'. This portion of the stream flows through the middle of the unit and changes channel type at the unit boundary.

Loc: G7-H7 Stream 3: AF2/II portion requires no-cut RMA buffer of 140' plus RAW 75'. This stream

flows along the southeast boundary.

Loc: I5 Stream 4: HC2/III portion requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This portion of the stream is the headwaters of Stream 4.

Loc: H7 Stream 4: AF2/II portion requires no-cut RMA buffer of 140', plus RAW buffer of 75'. This stream is located along the eastern boundary.

Identify and flag Class II, III, and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife

Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. RMA in the southeastern portion of the unit is also counted as reserve area. According to TPIT guidelines, RMAs along Class I and II streams that protrude into timber harvest units as peninsulas can contribute to marten and goshawk Standards and Guidelines. High Value Habitat - Deer: Harvest Area 29 acres; No Cut Area 29 acres.

Recreation/Scenery

No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the southern and western portions of the unit removed and/or buffered with 100 ft plus windfirm where appropriate. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:

High windthrow hazard. Small scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 272 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Small Slackline

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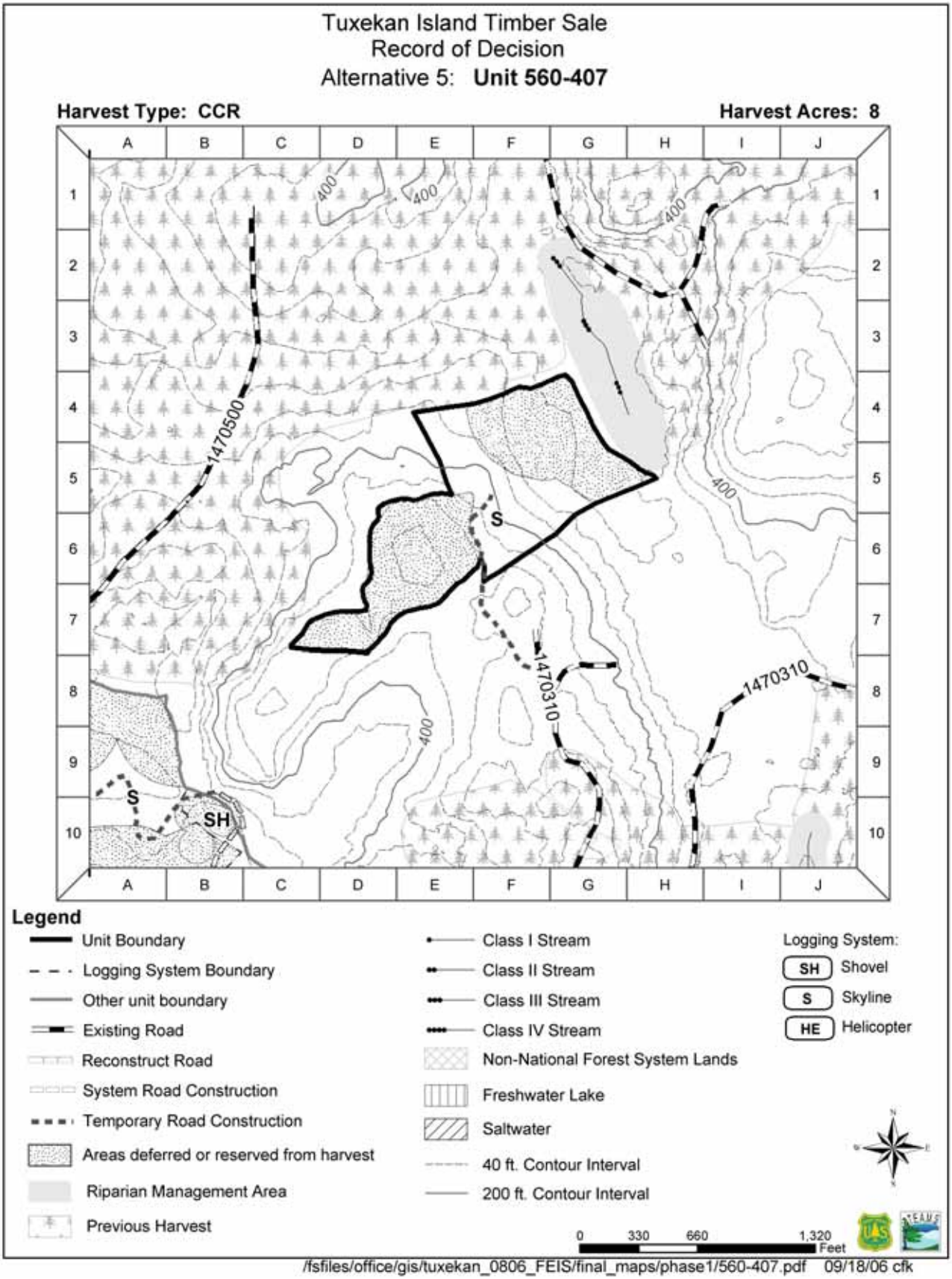
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-407 Quad Map: Craig D-4 **Photo #:** 00-11-7 **WAA:** 1531
Alternatives: 3, 4, 5 **Estimated Volume: Alt 5:** 316
Total Planned Acres:27 **Harvest Acres: Alt 5:** 8

Forest Type: Western Hemlock-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 27 **Slopes >72% harvest:** 0
Streams Class I: 1 **Class II:** 0 **Class III:** 0 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65% with a flatter, low-lying area along the beaver ponds to the east. Isolated steeper slopes as high as 90-100%+ were less than 30 feet in height and less than 2 acres in size. The soil on the slopes in the unit appears relatively stable. The soil on the steep slopes consists of organics overlying limestone with very little soil development. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were observed in the northeastern portion of the unit. No wetlands present within the harvest area; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 140 **Forested wetland (%area):** 0
Soil Type: 442CE (97%), 40DEX (2%), 220C **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Approximately 1000 feet of temporary road needed. Additional area of cable and shovel ground laid out but excluded due to karst. Regen area left in northwest for future unit. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on approximately 1.2 miles of 1470310 road.

Fish/Watershed
Small lake is located in the northeast corner of this unit.
Loc: G4 Stream/Lake: PA1/III consider a RMA buffer of 100’ plus RAW 75’.
Identify and flag lake during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16**.**

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/nesting will be done prior to implementation. High Value Habitat - Deer: Harvest Area 8 acres; No Cut Area 19 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the western and northeastern portions of the unit were removed. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Western portion of unit has significant existing windthrow. Basal area is 236 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Small Slackline

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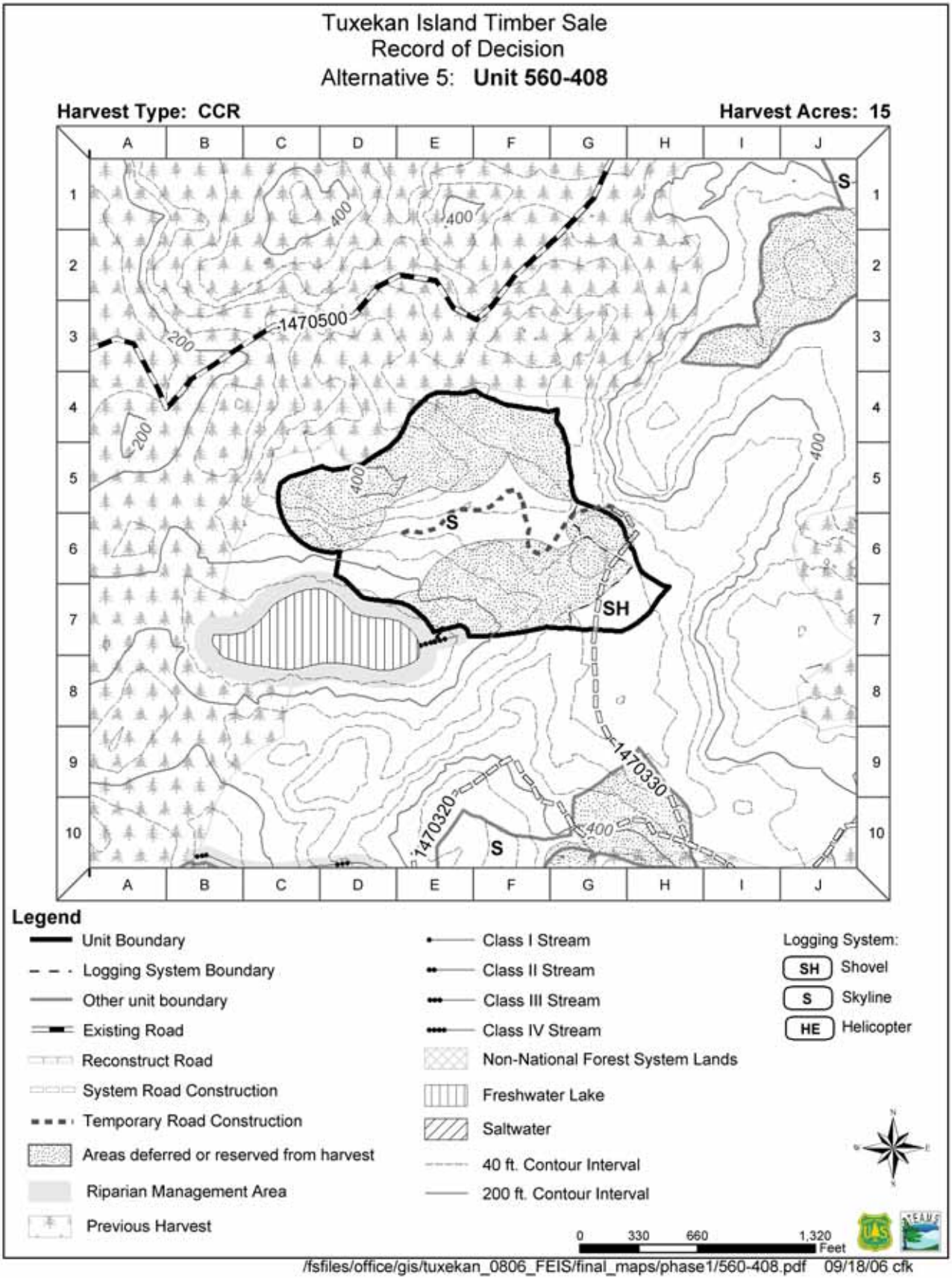
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-408 Quad Map: Craig D-4 **Photo #:** 00-10-3 **WAA:** 1531
Alternatives: 3, 4, 5 **Estimated Volume: Alt 5:** 572
Total Planned Acres:45 **Harvest Acres: Alt 5:** 15

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 44 **Slopes >72% harvest:** 1
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65% with isolated steep vertical cliffs in small random locations. None of the cliffs maintained 70%+ for 2 acres. All slopes drained to a lake at the south end of the unit. The soil on the slopes in the unit appears relatively stable. Steeper slopes in the upper elevations consist of moss layers overlying limestone with little underlying soil development. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Small areas of forested wetlands were observed in the bottom of karst lineaments identified in the unit. No wetlands present in the harvest area; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 0
Soil Type: 40DEX (37%), 442CE (63%) **Non-forested wetland (%area):** 0

Timber Input:

Cable and shovel logging. Partial log suspension required (BMP 13.9). Area reduced due to karst. Tailtrees required. Some tailholds in lake buffer. Approximately 1,700 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Construction of new 1470330 road required.

Fish/Watershed
Lake is located in the southwest boundary of this unit.

Loc: E7 Stream 1: MM1/III has a RMA buffer: 120', plus 25' RAW buffer. This stream is a tributary to the lake and flows into the east end of the lake.

Loc: E7 Stream 1.1: HC2/IV. No RMA buffer; yard away from stream to reduce slash. This stream is a tributary to Stream 1, on the east end of the lake.

Loc: B7-E7 Lake has a no cut RMA buffer of 100' plus 75' RAW buffer.

Identify and flag Class I, III, and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 15 acres; No Cut Area 30 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Semi-Primitive Non-Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the northern and southern portions of the unit were removed. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). In the FEIS, the location of the NFS road accessing the unit was shifted to lie outside the 100-foot- non-harvest buffers surrounding karst features identified during field inventory and unit layout. A log stringer bridge will be installed to cross karst feature on the proposed temporary road. Geotextile should be used on the bridge to keep aggregate overlay from falling into the collapsed feature (R10C5.206). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Most of western portion is mature timber which probably originated from a fairly large wind event. Small to medium scale gaps throughout the rest of the stand are indicative of stem snap and/or small group windthrow events. . Basal area is 348 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5 CCR by Running Skyline and CCR by Shovel

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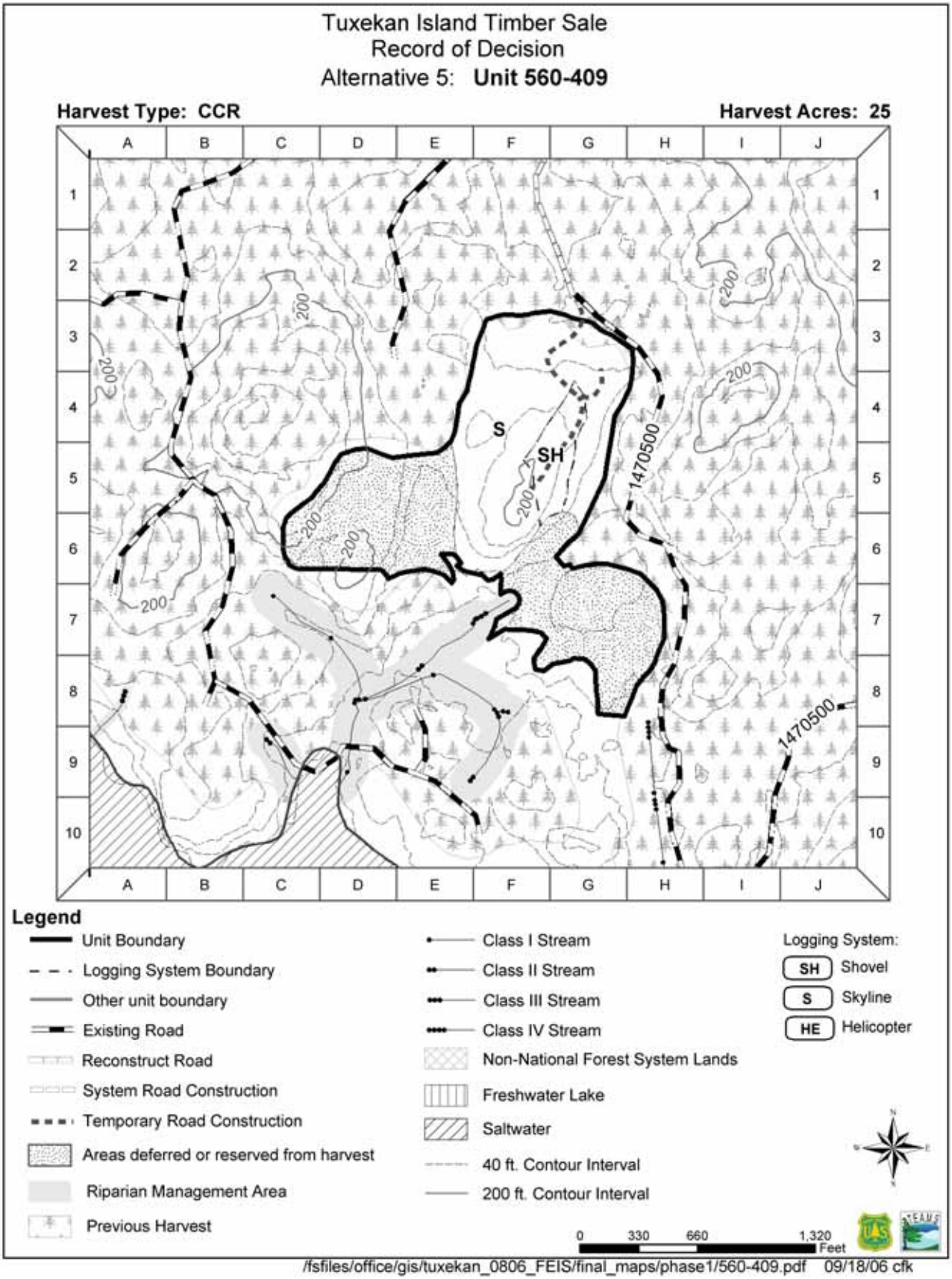
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-409 **Quad Map:** E (Craig D-4); W (Craig D-5) **Photo #:** 00-9-2 **WAA:**1531
Alternatives: 3, 5 **Estimated Volume: Alt 5:** 1072
Total Planned Acres:50 **Harvest Acres: Alt 5:** 25

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 48 **Slopes >72% harvest:** 1
Streams Class I: 2 **Class II:** 1 **Class III:** 1 **Class IV:** 0

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the north central area is three while the remainder is rated two. Minimum partial suspension for portion of unit rated MMI three. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 40DEX (35%), 442CE (65%) **Non-forested wetland (%area):** 0

Timber Input:
Cable and shovel logging. Partial log suspension required (BMP 13.9). Approximately 1700 feet of temporary road, with short pitches of 18% favorable grade. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Reconstruction required on approximately 2 miles of existing 1470500 road.

Fish/Watershed

Streams near this unit are located outside of the southern unit boundary.

Loc: C7-D8 Stream 1: MM1/I requires no-cut RMA buffer: 120', plus RAW buffer of 75'. This stream is located just outside of the southwest boundary.

Loc: F7 Stream 2: MM1/III has an RMA buffer: 120', plus 25' RAW buffer. This portion is the headwaters of Stream 2.

Loc: E7-D8 Stream 2: HC2/II portion requires no-cut RMA buffer: 100', plus RAW buffer of 75'. This stream is located just south of the middle of the unit and flows west.

Loc: D8-F8 Stream 3: MM1/I requires no-cut RMA buffer: 120', plus RAW buffer of 75'. This stream is located just outside of the southeast boundary and flows west.

Identify and flag Class III stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. RMA in the southern portion of the unit is also counted as reserve area. According to TPIT guidelines, RMAs along Class I and II streams that protrude into timber harvest units as peninsulas can contribute to marten and goshawk Standards and Guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 23 acres; No Cut Area 26 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription

meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils, and shovel yarding will be used for a portion of the unit. High vulnerability karst areas in the southwestern and southeastern portions of the unit were removed. Individual features were buffered with a 100-foot non-harvest buffer plus a wind firm buffer. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. A good portion of the east half appears even aged and probably originated from a fairly large wind event. Small to medium scale gaps throughout the rest of the unit is indicative of stem snap and/or small group windthrow events. There is significant existing windthrow in the south end. Basal area is 3272 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline and CCR by Shovel

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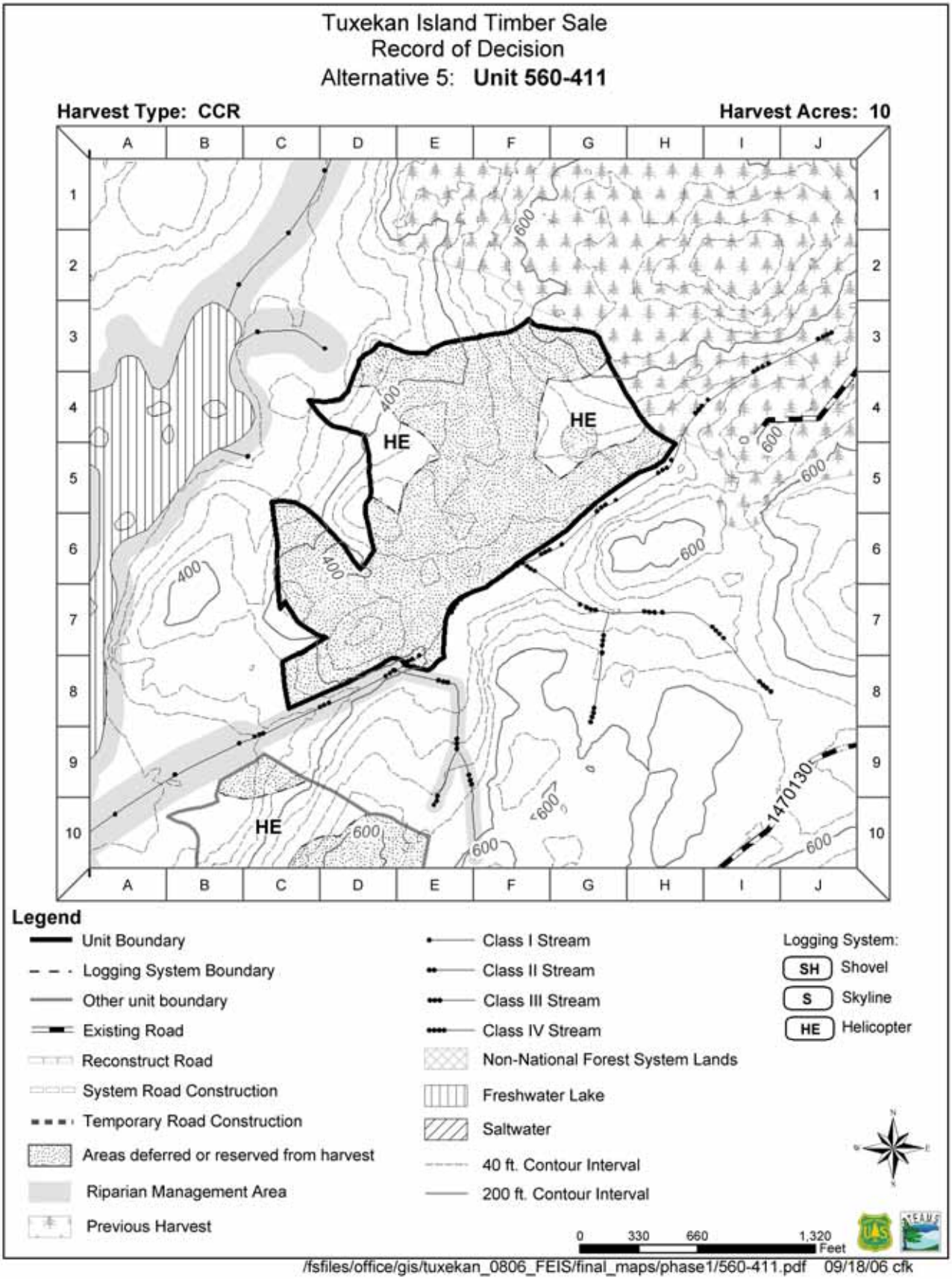
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-411 Quad Map: Craig D-4 **Photo #:** 00-12-8 **WAA:** 1531
Alternatives: 3, 4, 5 **Estimated Volume: Alt 5:** 536
Total Planned Acres: 60 **Harvest Acres: Alt 5:** 10

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 59 **Slopes >72% harvest:** 1
Streams Class I: 2 **Class II:** 0 **Class III:** 1 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65%. Steep slopes as high as 90-100%+ were found on the west sides of two knobs in the western portion of the unit. Erosion is a concern on steep slopes in the western portion of the unit. The soil on the slopes in the unit appears relatively stable. The soil on the steep slopes in the upper elevations consists of moss layers overlying limestone with very little soil development. With very shallow soils and undulating topography, there was no specific indication of slope instability observed in the unit. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter log entire unit to two locations on road 1470300 (3,200 feet NW or 3,500 feet SW of the unit). Partial log suspension required (BMP 13.9).

Engineering
N/A.

Fish/Watershed
ADF&G catalogued stream/lake #103-90-10960-2003-0010 is located on the western edge of this unit Coho salmon are present. One Class I streams flow into this lake, a second Class III/IV stream flows along the southern border of the unit and eventually into the lake.

Loc: D3 Stream 1: MM1/I I requires no-cut RMA buffer: 120', plus RAW buffer of 75'. This stream is located just outside of the northwest boundary
Loc: B4-5 Lake: requires no-cut RMA buffer: 100', plus RAW buffer of 75'.
Loc: E8-H5 Stream 2: MC1/IV no RMA buffer; yard away from stream to reduce slash. This portion of the stream is the headwaters of the stream on the southern boundary.
Loc: D8-C8 Stream 2: HC3/III requires RMA buffer defined as V-notch (side-slope break), plus 25' RAW buffer. This portion of the stream creates the southwest border of the unit.
Loc: A9-B8 Stream 2: MM1/I this portion of the stream requires no-cut RMA buffer: 120', plus RAW buffer of 75'. This portion of the stream flows west of the southwest boundary into the lake.

Identify and flag Class III and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 10 acres; No Cut Area 50 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the northern, central, and western portions of the unit were removed, as were the steep cliffs. Several areas of high vulnerability karst were discovered during inventory and unit layout and have been removed from the unit and/or buffered by a 100-foot no-harvest buffer plus wind firmness and slope break. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Moderate windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 250 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Helicopter

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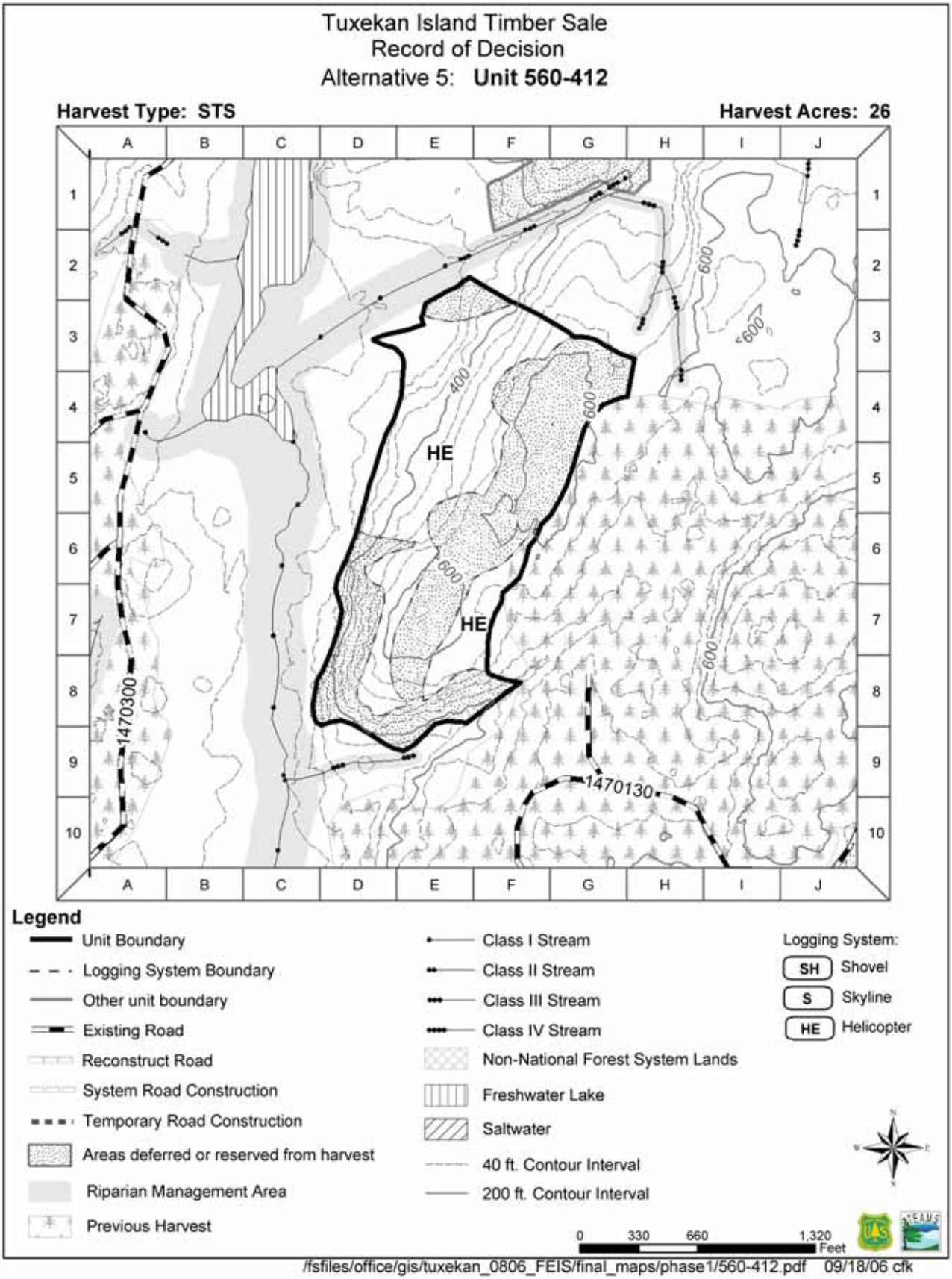
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-412 Quad Map: Craig D-4 **Photo #:** 00-11-7 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 426
Total Planned Acres: 57 **Harvest Acres: Alt 5:** 26

Forest Type: Western Hemlock-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 57 **Slopes >72% harvest:** 1
Streams Class I: 3 **Class II:** 0 **Class III:** 2 **Class IV:** 0

Soils Input:
Slopes in the uppermost portion of the unit, along the ridge ranged from 40 to 65%, with 90%+ in the western and southern portion of the unit. The entire western portion of the unit maintained steep cliff bands with less sloping benches separating, averaging overall slopes exceeding 80%. The soil on the slopes in the unit appears relatively stable. The steep cliff bands in the western portion of the unit may be of concern for potential rock/landslide, with thin soils on the extensive grikes systems a potential concern for regeneration purposes. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 140 **Forested wetland (%area):** 0
Soil Type: 40DEX (18%), 442CE (82%) **Non-forested wetland (%area):** 0

Timber Input:
Helicopter logging (due to karst) to road 1470300 (1,700 feet W of the unit). Partial log suspension required (BMP 13.9).

Engineering

N/A.

Fish/Watershed
ADF&G catalogued stream/lake #103-90-10960-2003-0010 is located on the western edge of this unit Coho salmon are present. One Class I stream flows into this lake at the northern boundary, a second Class I stream parallels the western boundary (Stream 2) and a second Class III stream flows into the outlet of the lake along the southern border of the unit (Stream 3).

Loc: G1-E2 Stream 1: HC3/III requires buffer to the V-notch (side-slope break), plus 25' RAW buffer for this portion of the stream. This stream is located outside of the northern boundary.
Loc: E2-C4 Stream 1: MM1/I requires no-cut RMA buffer: 120' plus RAW 75'. This portion of the stream flows along the northern boundary of the unit.
Loc: C5-C6 Stream 2: PA1/I requires no-cut RMA buffer: 100', plus RAW buffer of 75'. This stream flows north to south along the western boundary. This stream flows southwest along the northwest boundary of the unit.
Loc: C7-C9 Stream 2: FP3/I requires no-cut RMA buffer: 130', plus RAW buffer of 75'. This portion of the stream flows along the southern half of the unit along the western boundary
Loc: C9-E9 Stream 3: HC6/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This stream flows outside of the southern boundary.

Identify and flag Class I stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Single Tree Selection over harvest area with 31 acres of no cut area meets marten and goshawk standards and guidelines to maintain an average canopy closure of >/=30%. High Value Habitat - Deer:

Harvest Area 26 acres; No Cut Area 31 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas in the southern and eastern portions of the unit were removed. Individual features were buffered with a 100-foot non-harvest buffer plus a wind firm buffer. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Moderate windthrow hazard. Southern end of unit (southeast side of ridge) appears even aged, probably originated from single windthrow event. This area has some existing windthrow from the harvest unit to the south. The remainder is less susceptible having small to medium scale gaps throughout stand which indicates stem snap and/or small group windthrow events. Single Tree Selection will result in the harvest of about 22 trees per acre, leaving a residual stand containing 195 BA (approximate). Harvest hemlock 30 inches or greater, spruce and red cedar 20 inches and greater (species and diameter classes to be refined during layout), up to 25% of the stand basal area (total 260 sq ft per acre). Protect residual stand and advanced reproduction. Leave all Alaska yellow cedar that meet reserve tree guides. This sets up an uneven-age management plan, with expected re-entries on a 50-year cycle, with approximately 25% basal area removal at each entry.

Alternative 5: Single Tree Selection by Helicopter

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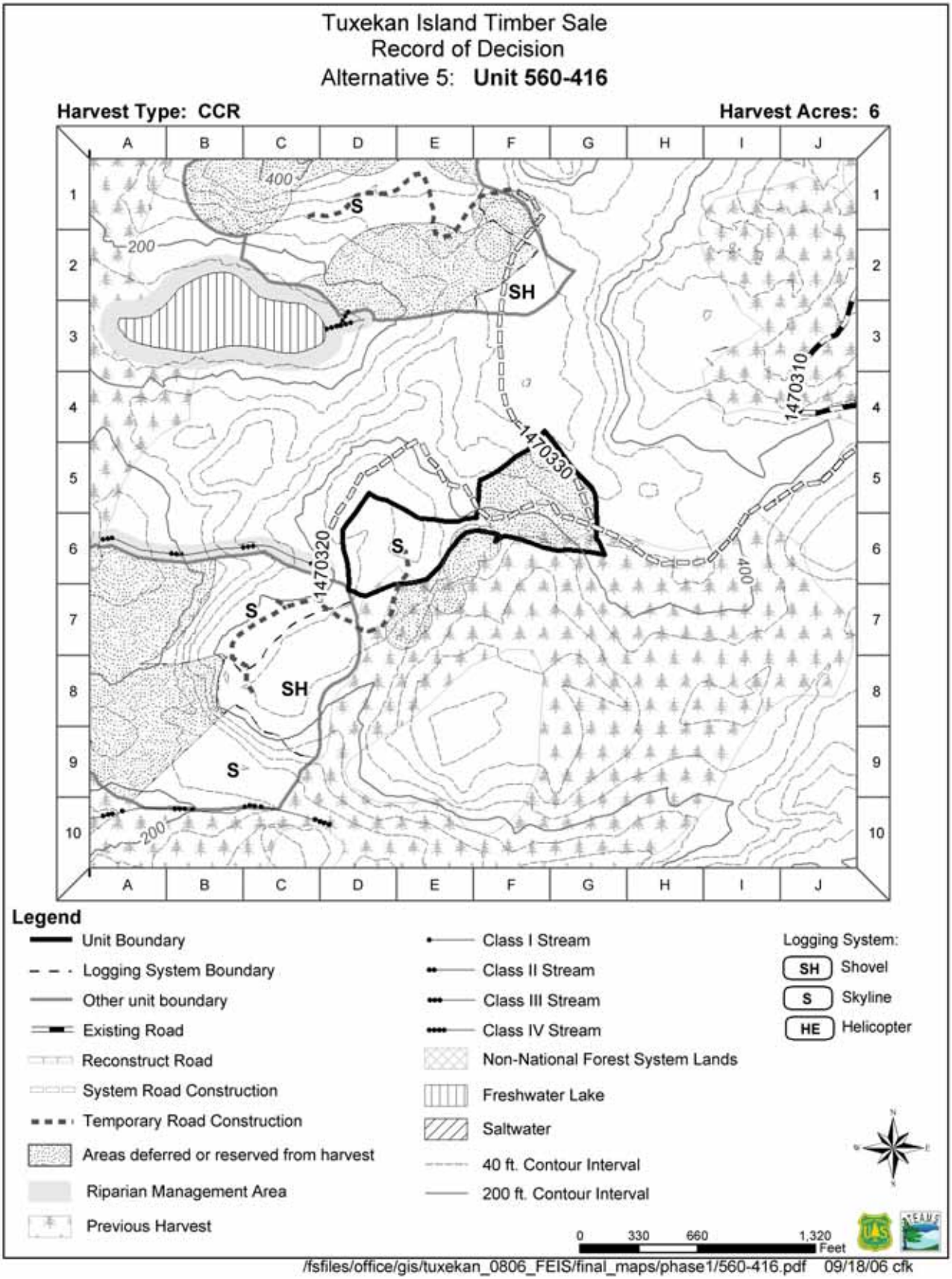
Tuxekan Island Timber Sale
Record of Decision
Alternative 5: Unit 560-416
Harvest Type: CCR
Harvest Acres: 6
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10
400
200
S
SH
1470310
1470330
1470320
Legend
Unit Boundary
Logging System Boundary
Other unit boundary
Existing Road
Reconstruct Road
System Road Construction
Temporary Road Construction
Areas deferred or reserved from harvest
Riparian Management Area
Previous Harvest
Class I Stream
Class II Stream
Class III Stream
Class IV Stream
Non-National Forest System Lands
Freshwater Lake
Saltwater
40 ft. Contour Interval
200 ft. Contour Interval
Logging System:
SH Shovel
S Skyline
HE Helicopter
0 330 660 1,320 Feet
/fsfiles/office/gis/tuxekan_0806_FEIS/final_maps/phase1/560-416.pdf 09/18/06 cfk

Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-416 **Quad Map:** Craig D-4 **Photo #:** 00-10-3 **WAA:** 1531
Alternatives: 3, 4, 5 **Estimated Volume: Alt 5:** 219
Total Planned Acres:13 **Harvest Acres: Alt 5:** 6

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 12 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 0

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65%. The rock and soils on slopes in the unit appear relatively stable with no evidence for slope stability concerns. Forested wetlands were not observed in this unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Approximately 900 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on approximately .7 miles of 1470310 road. Construction of new 1470320 road required. Roads 1470330 and 1470320 are located within the unit.

Fish/Watershed
One Class III stream is located outside the west boundary of the unit.
Loc: C6 Stream 1: HC6/III requires buffer to the V-notch (side-slope break), plus 25' RAW buffer.
Identify and flag Class III stream during layout

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 5 acres; No Cut Area 7 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Semi-Primitive Non-Motorized

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with small areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. In the DEIS, high vulnerability karst areas are present adjacent to NFS road accessing unit outside the unit boundary. The road has been relocated for the FEIS to the north and west, away

from the area of high vulnerability karst. Individual features were buffered with a 100-foot non-harvest buffer plus a wind firm buffer. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Selective harvesting occurred within the stand (probably 1940s). Stand is a mosaic of old growth and second growth originating from earlier harvests. Basal area is 235 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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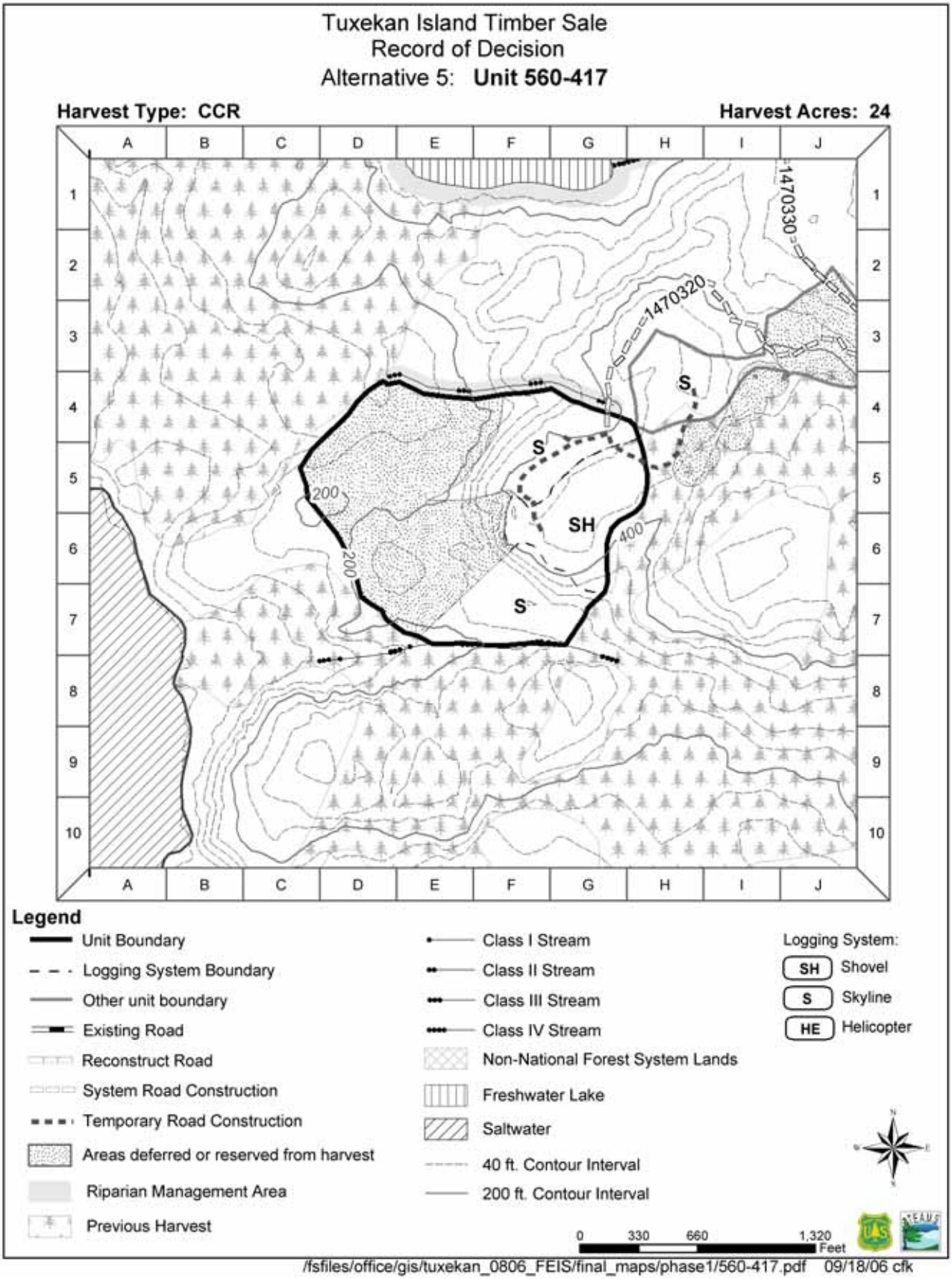
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-417 Quad Map: Craig D-4 **Photo #:** 00-10-3 **WAA:** 1531
Alternatives: 3, 4, 5 **Estimated Volume: Alt 5:** 1077
Total Planned Acres:49 **Harvest Acres: Alt 5:** 24

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 45 **Slopes >72% harvest:** 4
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65% with steep vertical cliffs running from the southeastern corner of the unit to the middle northern border. The rock and soils on slopes in the unit appear relatively stable. Expansive, steep vertical and sub-vertical cliff bands extending from the southeastern boundary of the unit through to the northern boundary are documented on the slopes maps. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. No wetlands observed; no concerns. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable and shovel yarding. Running skyline yarder required at landings 1 and 2 as no front guyline placement feasible, precluding the use of small slackline yarder. Leave timber on 72% slope below landing and cut corridors through the steep area for yarding timber below the steep area. Partial log suspension required (BMP 13.9) over steep areas below Landings 1 and 2. Tailtrees required. Approximately 1,000 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on approximately .7 miles of 1470310 road. Construction of new 1470320road required.

Fish/Watershed
Only one Class III stream located along the northern border of this unit.
Loc: E4-G4 Stream 1: HC6/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer
Loc: D7-G7 Stream 2: MM1/IV no RMA buffer; yard away from stream to reduce slash.
Identify and flag Class III and IV streams during layout. Riparian standards and guidelines. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 21 acres; No Cut Area 25 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff

Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Semi-Primitive Non-Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with small areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. High vulnerability karst areas are adjacent to classified road accessing unit outside the unit boundary and along western unit boundary. After additional reconnaissance and inventory, the classified road was rerouted to the north in order avoid impacting karst features. Individual features were buffered with a 100-foot non harvest buffer plus a wind firm buffer. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:

High windthrow hazard. Western portion appears even aged, probably originated from a single windthrow event. The remainder has small to medium scale gaps throughout which are indicative of stem snap and/or small group windthrow events. Basal area is 292 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline CCR by Shovel

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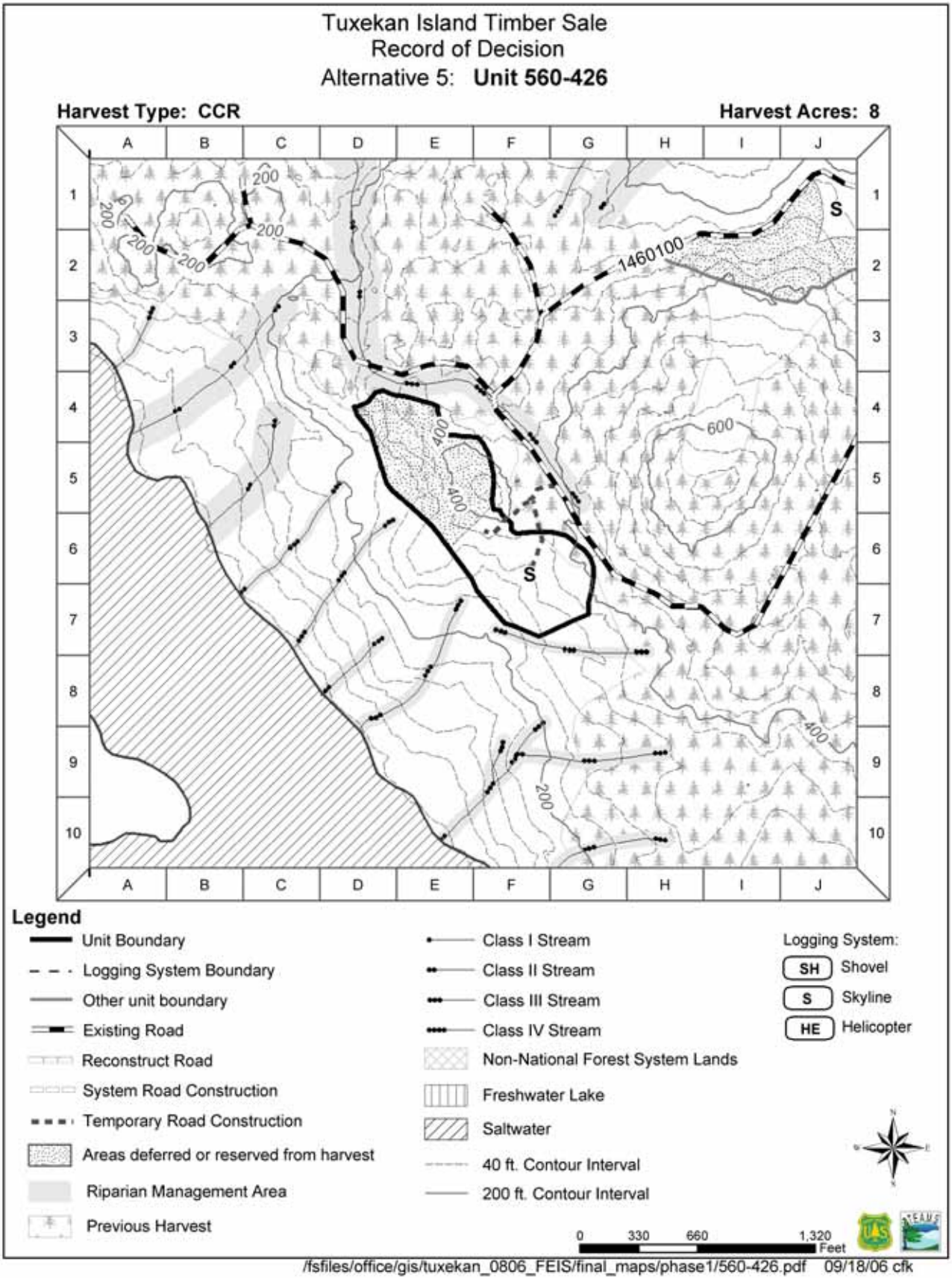
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-426 **Quad Map:** Craig D-4 **Photo #:** 00-11-2 **WAA:** 1531
Alternatives: 2, 3, 5 **Estimated Volume: Alt 5:** 449
Total Planned Acres:17 **Harvest Acres: Alt 5:** 8

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 15 **Slopes >72% harvest:** 1
Streams **Class I:** 0 **Class II:** 0 **Class III:** 5 **Class IV:** 0

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Guyline extensions required at Landing 4. Approximately 1000 feet of temporary road, with 50-70 feet of blasting required. Blasting also required for landing construction. Some sideblocking may be required. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
N/A.

Fish/Watershed
Five Class III streams are adjacent to this unit. Stream 1 borders the north boundary of the unit.

Loc: D4-G5 Stream 1: HC3/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer

Loc: D5 Stream 2: HC5/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This stream is located outside of the northwest boundary.

Loc: D6 Stream 3: HC5/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This stream is located outside of the west boundary, south of Stream 2.

Loc: D8-E7 Stream 4: HC6/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This stream is located at the southwest boundary. The stream flows east to west.

Loc: F7-H7 Stream 5: HC5/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This stream is located along the southern boundary.

Identify and flag Class III streams during layout. BMPs include 12.4, 12.6, 12.6a and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 8 acres; No Cut Area 9 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is moderate vulnerability (per Forest Service Geologist and 1995 Karst Vulnerability Report (Harza 1995)). Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
Very high windthrow hazard. Southern half appears to be even age mature which probably originated from a single wind event. The rest has small to medium scale gaps throughout stand more indicative of individual or small group windthrow events. Some windthrow was observed in the unit. Basal area is 345 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline and CCR by Small Slackline

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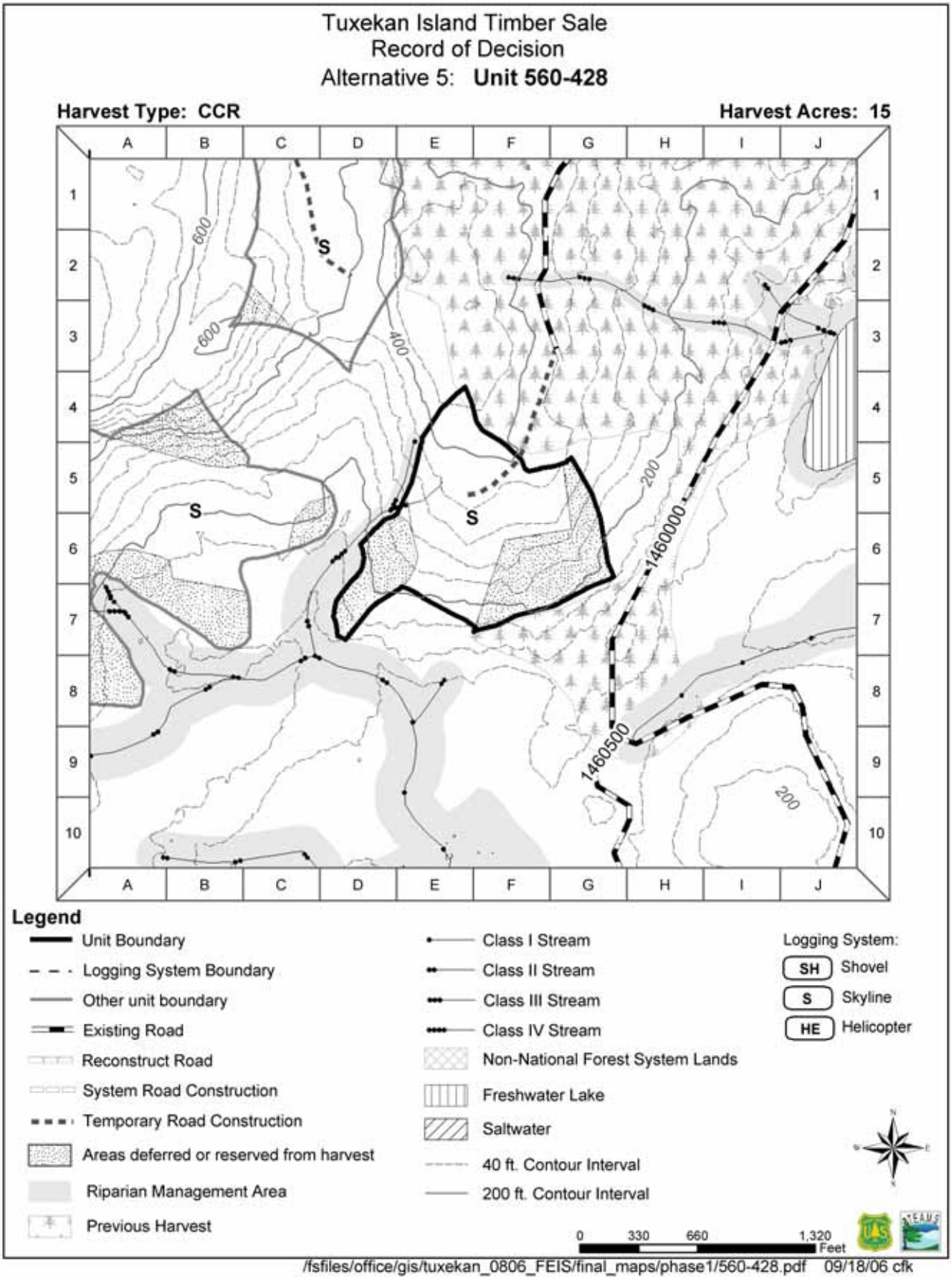
Tuxekan Island Timber Sale
Record of Decision
Alternative 5: Unit 560-428
Harvest Type: CCR
Harvest Acres: 15
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10
600
600
400
200
200
1460000
1460500
S
S
S
Legend
Unit Boundary
Logging System Boundary
Other unit boundary
Existing Road
Reconstruct Road
System Road Construction
Temporary Road Construction
Areas deferred or reserved from harvest
Riparian Management Area
Previous Harvest
Class I Stream
Class II Stream
Class III Stream
Class IV Stream
Non-National Forest System Lands
Freshwater Lake
Saltwater
40 ft. Contour Interval
200 ft. Contour Interval
Logging System:
SH Shovel
S Skyline
HE Helicopter
0 330 660 1,320 Feet
/fsfiles/office/gis/tuxekan_0806_FEIS/final_maps/phase1/560-428.pdf 09/18/06 cfk

Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 560-428 Quad Map: Craig D-4 **Photo #:** 00-12-6 **WAA:** 1531
Alternatives: 2, 3, 5 **Estimated Volume: Alt 5:** 736
Total Planned Acres:39 **Harvest Acres: Alt 5:** 15

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 5 **High:** 34 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 2 **Class III:** 1 **Class IV:** 1

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14,, 14.2, 14.3 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (86%), 220C (14%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Tailtrees required. Multiple stump skyline anchors require along southwest edge of setting 1. Approximately 1000 feet of temporary road to be constructed beyond end of existing road. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on approximately 0.6 miles of 1470110 road.

Fish/Watershed
The west and southern borders of this unit are surrounded by streams.

Loc: E5 Stream 1: HC5/IV No RMA. Yard away from stream to reduce slash. This stream is a tributary to Stream 2 and is located in the northwest corner of the unit.

Loc: D6 Stream 2: HC2/III requires RMA buffer to the V-notch (side-slope break), plus 25' RAW buffer. This stream creates the northwest boundary.

Loc: D7-8 Stream 2: AF2/II this portion requires no-cut RMA buffer: 140', plus RAW buffer of 75'. This portion of the stream is located along the southwest boundary and continues to flow east to create the southern boundary as well.

Loc: E8 Stream 3: HC2/II requires no-cut RMA buffer: 100', plus RAW buffer of 75'. This stream is located outside of the southern boundary and flows into Stream 2.

Identify and flag Class II, III and IV streams during layout. BMPs include 12.4, 12.6, 12.6a and 13.16.

Wildlife
Reserves maintain >/=30% canopy closure per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 15 acres; No Cut Area 16 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Appendix 1 – Unit Cards

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Harvesting to the south resulted in windthrow along the stand edge. Eastern half is mature timber which probably originated from a fairly large wind event. Western portion is lower volume & less susceptible to windthrow. Basal area is 250 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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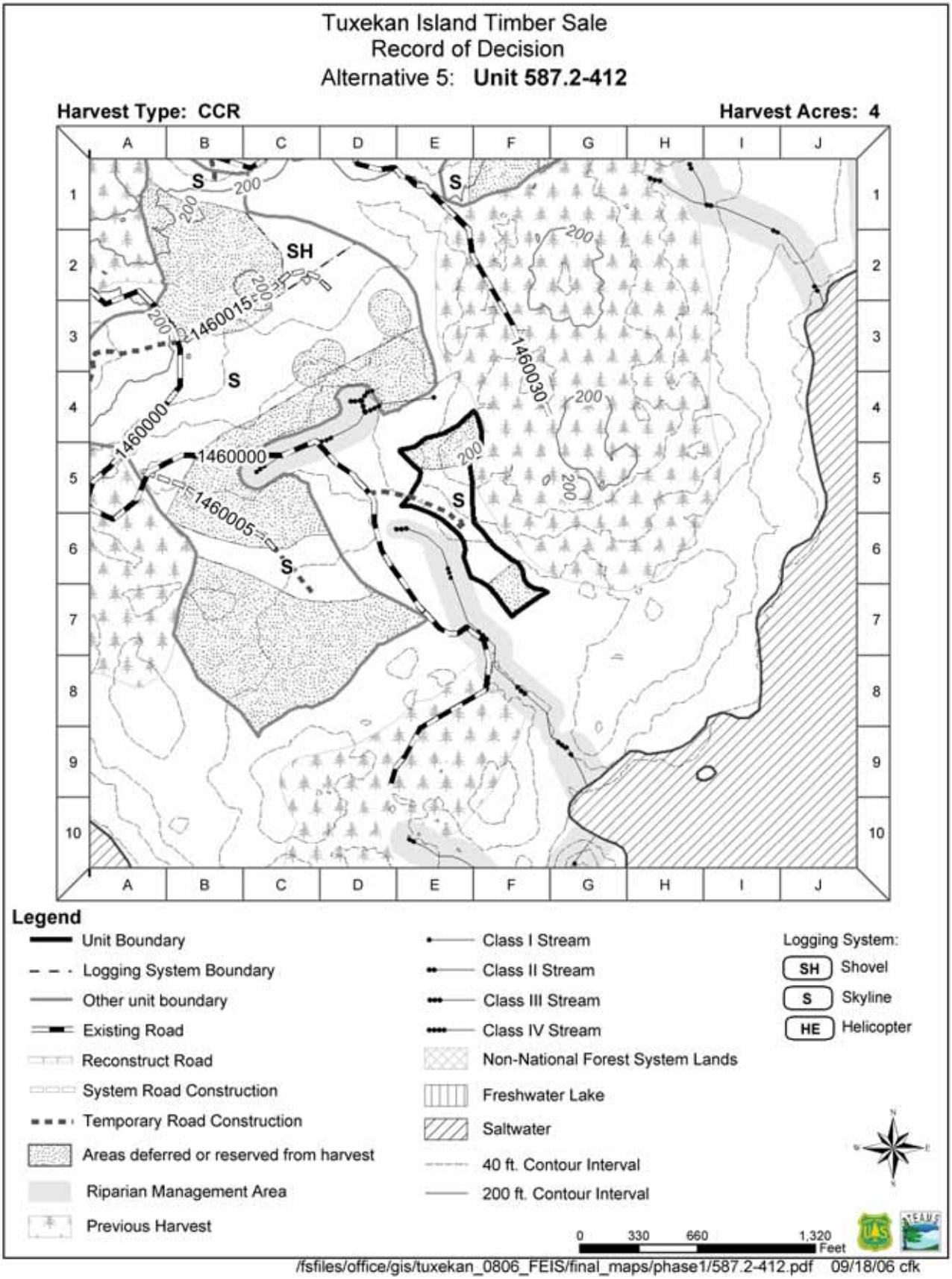
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-412 Quad Map: Craig D-4 **Photo #:** 00-12-3 **WAA:** 1531
Alternatives: 2, 3, 5 **Estimated Volume: Alt 5:** 93
Total Planned Acres: 8 **Harvest Acres: Alt 5:** 4

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 7 **Slopes >72% harvest:** 1
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 0

Soils Input:
The mass movement index (MMI) for the entire unit it two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Tailtrees required. Approximately 600 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
N/A.

Fish/Watershed
There is one Class III stream located on the west boundary.
Loc: E6 Stream 1: MM1/III portion has an RMA buffer: 50' plus RAW 25'.
Loc: E6-7 Stream 1: PA5/III portion has an RMA buffer: 100' plus RAW 25'
Identify and flag Class III stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 4 acres; No Cut Area 4 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Moderate karst vulnerability (per Forest Service Geologist and 1995 Karst Vulnerability Report (Harza 1995)). Partial log suspension is required to protect exposed epikarst. If significant features are identified during unit layout, the Forest service Geologist will be contacted to determine the appropriate

mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For associated temporary roads ensure that road drainage is designed in such that sediment is deposit prior to entry into surface waters and that no road associated drainage empties directly into any any karst feature (BMP 14.3, SGVA8); No karst features will be used for construction or logging debris disposal (SGVA2, 7, 8; BMP 14.10, 14.19); any culverts needed will be designed under the guidelines of BMP 14.17 to ensure adequate design; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures should be installed and maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP 14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 240 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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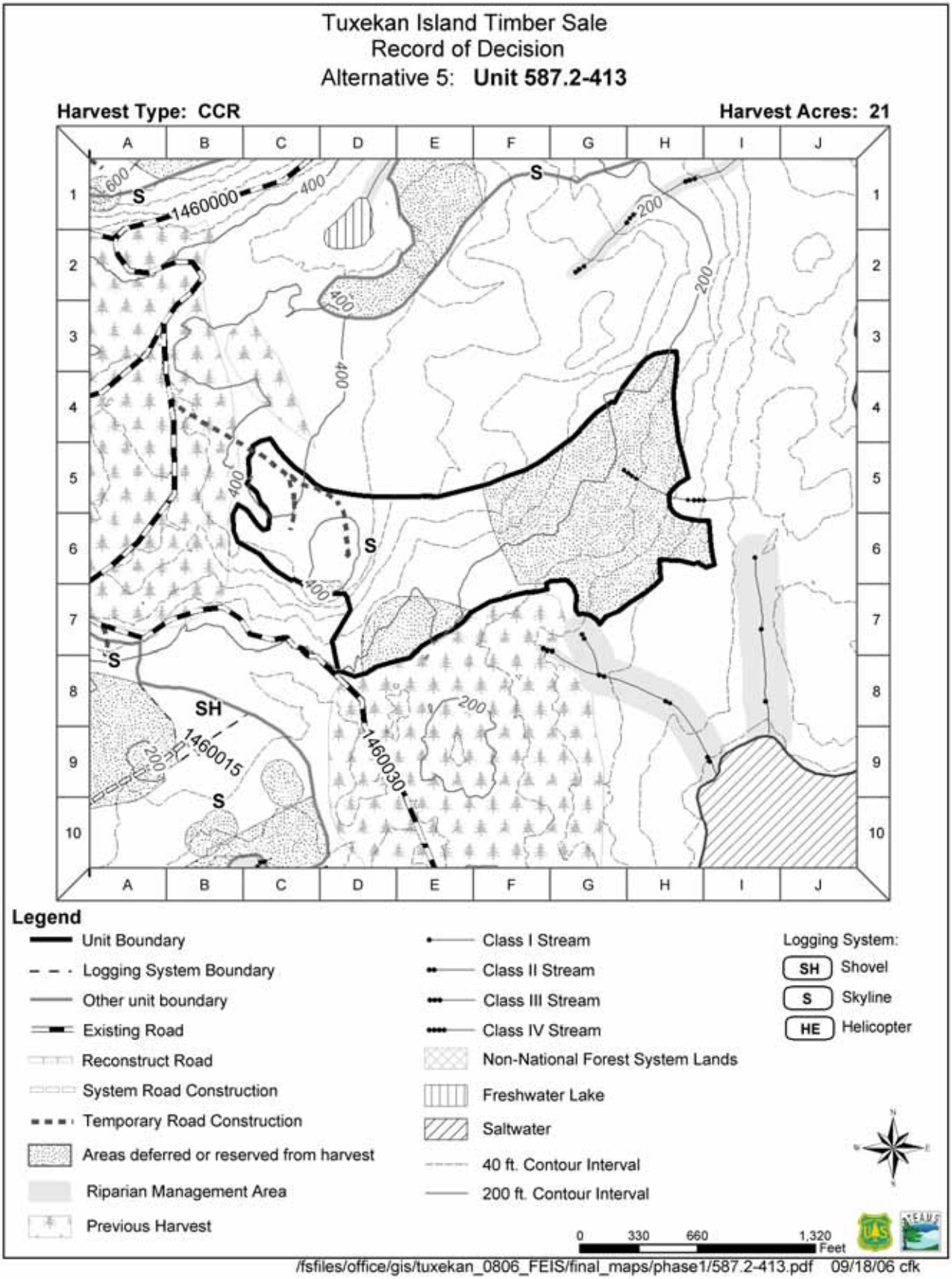
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-413 Quad Map: Craig D-4 **Photo #:** 00-11-3 **WAA:** 1531
Alternatives: 2, 3, 5 **Estimated Volume: Alt 5:** 702
Total Planned Acres:42 **Harvest Acres: Alt 5:** 21

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 42 **Slopes >72% harvest:** 1
Streams Class I: 1 **Class II:** 1 **Class III:** 0 **Class IV:** 1

Soils Input:
Slopes throughout the unit generally ranged from 40% to 65%. Steep slopes as high as 90-100%+ were located on the east and west flanks of a knob in the western portion of the unit. The soil on the slopes in the unit appears relatively stable. The steep cliff bands in the western portion of the unit may be of concern for potential rock/landslide. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. Forested wetlands were not observed in the unit; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 40DEX (19%), 442CE (81%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Approximately 1700 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Pre-haul maintenance required on approximately .7 miles of 1460030 road.

Fish/Watershed
One Class I stream and one Class II stream just outside of the unit boundaries. One Class IV in the unit in the deferred area.

Loc: H5 Stream 1: MM1/IV. no RMA; yard away from stream to reduce slash. This stream is located in the southeast corner of the unit.
Loc: I6 Stream 2: MM1/I requires no-cut RMA buffer: 120', plus RAW buffer of 75'. This stream is located just outside of the southeast boundary.
Loc: G7 Stream 3: HC2/II requires no-cut RMA buffer: 100', plus RAW buffer of 75'. This stream is located just outside of the southern boundary in the middle of the unit.

Identify and flag Class II stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. If active bald eagle nests are found along the shoreline adjacent to this unit, mitigation will be considered and applied where needed to reduce the potential for disturbance. Surveys are not necessary if disturbance occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on project activity may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season. High Value Habitat - Deer: Harvest Area 21 acres; No Cut Area 21 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the

project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Semi-Primitive Motorized/Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability to the south and low vulnerability where glacial till is thickest to the north. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
Extreme windthrow hazard. Eastern half appears even aged, probably originated from a single wind event. The extreme western portion has considerable existing windthrow. The central portion of the unit contains small to medium scale gaps more indicative of small group windthrow events. Feather northern boundary to reduce potential for windthrow in adjacent second-growth stand. Basal area is 275 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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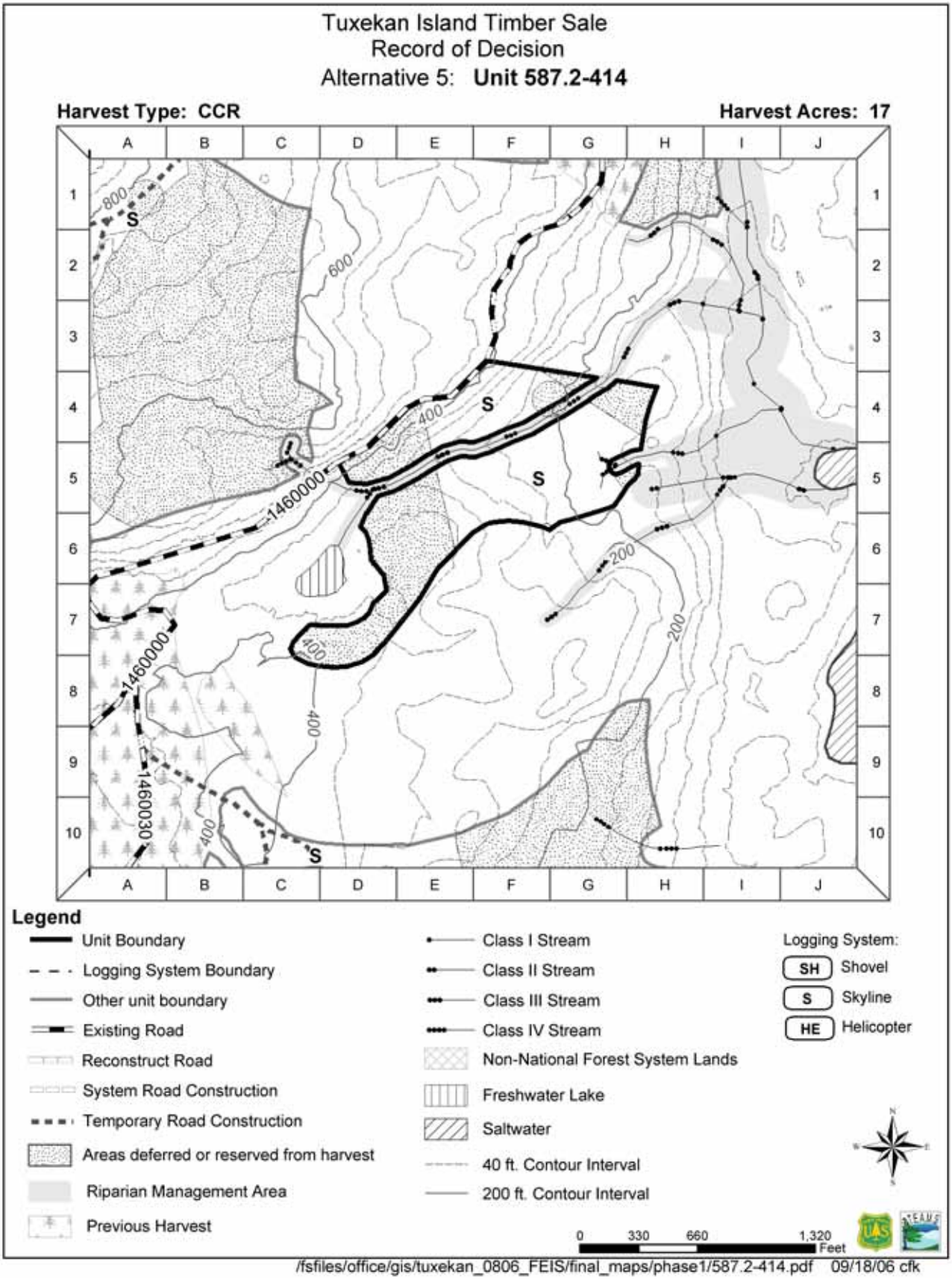
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-414 Quad Map: Craig D-4 **Photo #:** 00-12-4 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 497
Total Planned Acres:35 **Harvest Acres: Alt 5:** 17

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 4
Volume Strata:Low: 0 **Medium:** 0 **High:** 34 **Slopes >72% harvest:** 1
Streams Class I: 0 **Class II:** 1 **Class III:** 4 **Class IV:** 1

Soils Input:
Proposed harvest areas have no slopes > 72% with contiguous acreage over 1 acre. The mass movement index (MMI) for the entire unit is two. Minimum partial harvest in areas greater than 72% slope to minimize soil displacement. Forested wetlands were not identified within the unit on the Forest Service wetlands map. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required with full suspension over Class III stream (BMP 13.9). Corridors will be required to yard through the Class III RMA buffer. Increased payload possible with tailholds in the beach fringe buffer. Very few tailtrees available, and tailholds sparse in places. Rock excavation required at Landing 2. Leave timber on 72% slope below landing and cut corridors through the steep area for yarding timber below the steep area.

Engineering
N/A.

Fish/Watershed

A Class III stream splits this unit in half.

Loc: D5-G4	Stream 1: HC2/III requires an RMA buffer defined as a V-notch (side-slope break), plus 25’ RAW buffer. This stream flows into the northwest corner of the unit and flows east through the unit.
Loc: D6	Stream 2: HC2/III requires an RMA buffer defined as a V-notch (side-slope break), plus 25’ RAW buffer. This stream flows into Stream 1 from the lake.
Loc: D6	Lake: requires no-cut RMA buffer: 100’, plus RAW buffer of 75’.
Loc: G6	Stream 3: HC6/III requires an RMA buffer defined as a V-notch (side-slope break), plus 25’ RAW buffer
Loc: H6	Stream 4: HC2/II requires no-cut RMA buffer: 100’, plus RAW buffer of 75’. This stream is located just outside of the southeast corner of the unit.
Loc: G5	Stream 4: HC2/IV. No RMA. Yard away from stream to reduce slash. This stream is just north of Stream 3 and becomes a Class III stream just downstream.
Loc: H5	Stream 4: HC2/III requires an RMA buffer defined as a V-notch (side-slope break), plus 25’ RAW buffer. This stream flows west to east just outside of the southeast corner of the unit.

Identify and flag Class I, II, III, and IV streams during layout. BMPs include 12.4, 12.6, 12.6a and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 17 acres; No Cut Area 18 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
High windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Some windthrow incursions occurred originating from the 1940's harvesting to the southeast. Basal area is 285 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Small Slackline

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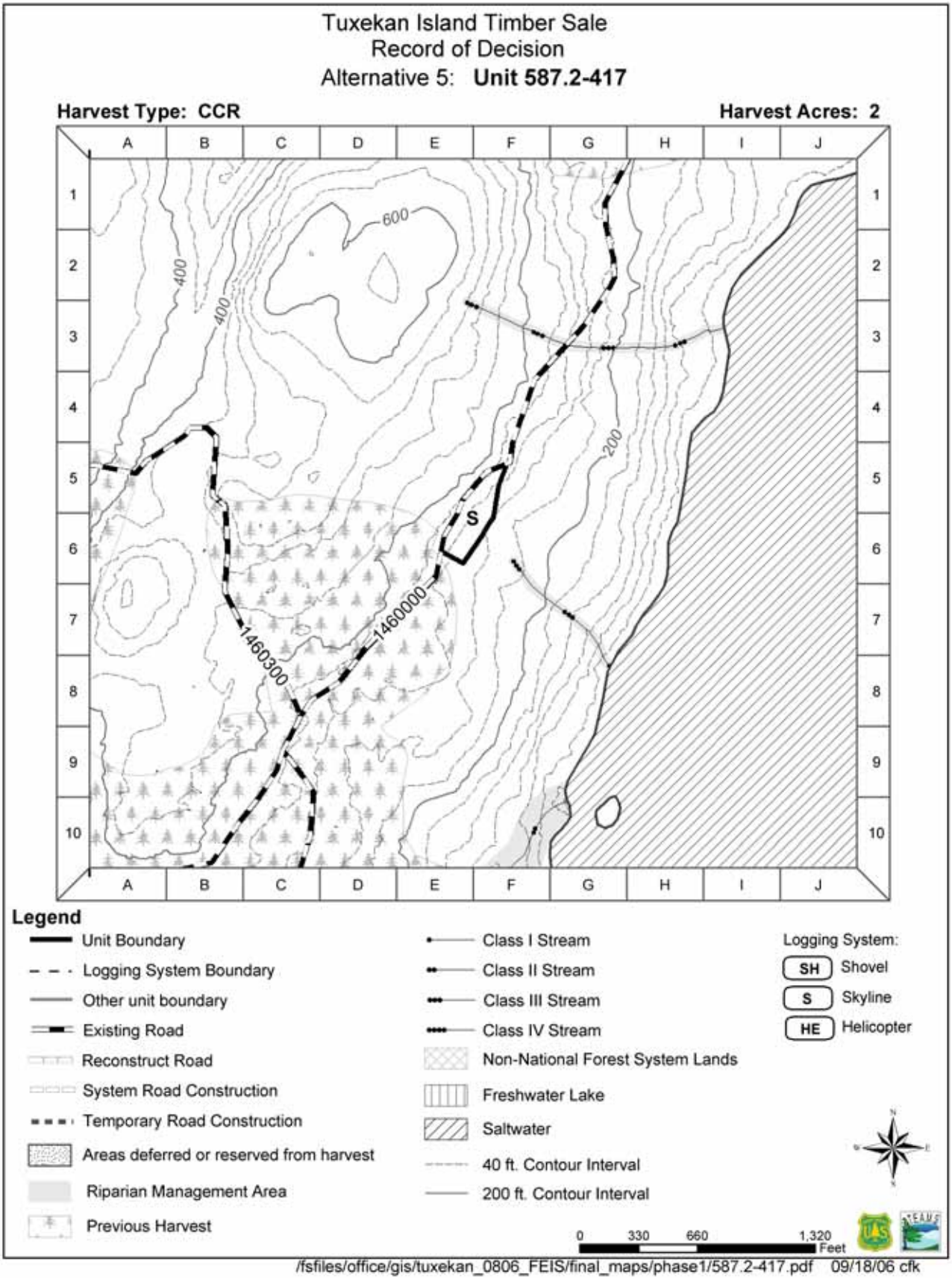
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-417 Quad Map: Craig D-4 **Photo #:** 00-13-4 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 72
Total Planned Acres: 2 **Harvest Acres: Alt 5:** 2

Forest Type: Western Hemlock-Well Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 2 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 0

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is two. No specific harvest methods specified. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.12, 14.19, and 14.22.
Plant Association: 140 **Forested wetland (%area):** 0
Soil Type: 442CE (100%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9).

Engineering
N/A.

Fish/Watershed
One Class III stream is located outside of the southeast boundary.
Loc: F6 Stream 1: HC5/III requires an RMA buffer defined as a V-notch (side-slope break), plus 25' RAW buffer. This stream is located outside of the southeast boundary.

Wildlife
Marten and goshawk standards and guidelines are required on openings exceeding 2 acres in size and, therefore, do not apply to this unit. High Value Habitat - Deer: Harvest Area 2 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Semi-Primitive Motorized

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:

Moderate vulnerability karst is found within the unit. Partial log suspension is required to protect exposed epikarst. If significant features are identified during unit layout, the Forest service Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Very high windthrow hazard. Small to medium scale gaps throughout stand and surrounding area indicates stem snap and/or small group windthrow events. Existing windthrow observed in the unit originating from the harvest unit to the south. Basal area is 250 sq ft per acre. At two acres, this unit

does not require retention. This is an even-aged clearcut, providing the final unit acreage is two-acres or less.

Alternative 5: CCR by Running Skyline

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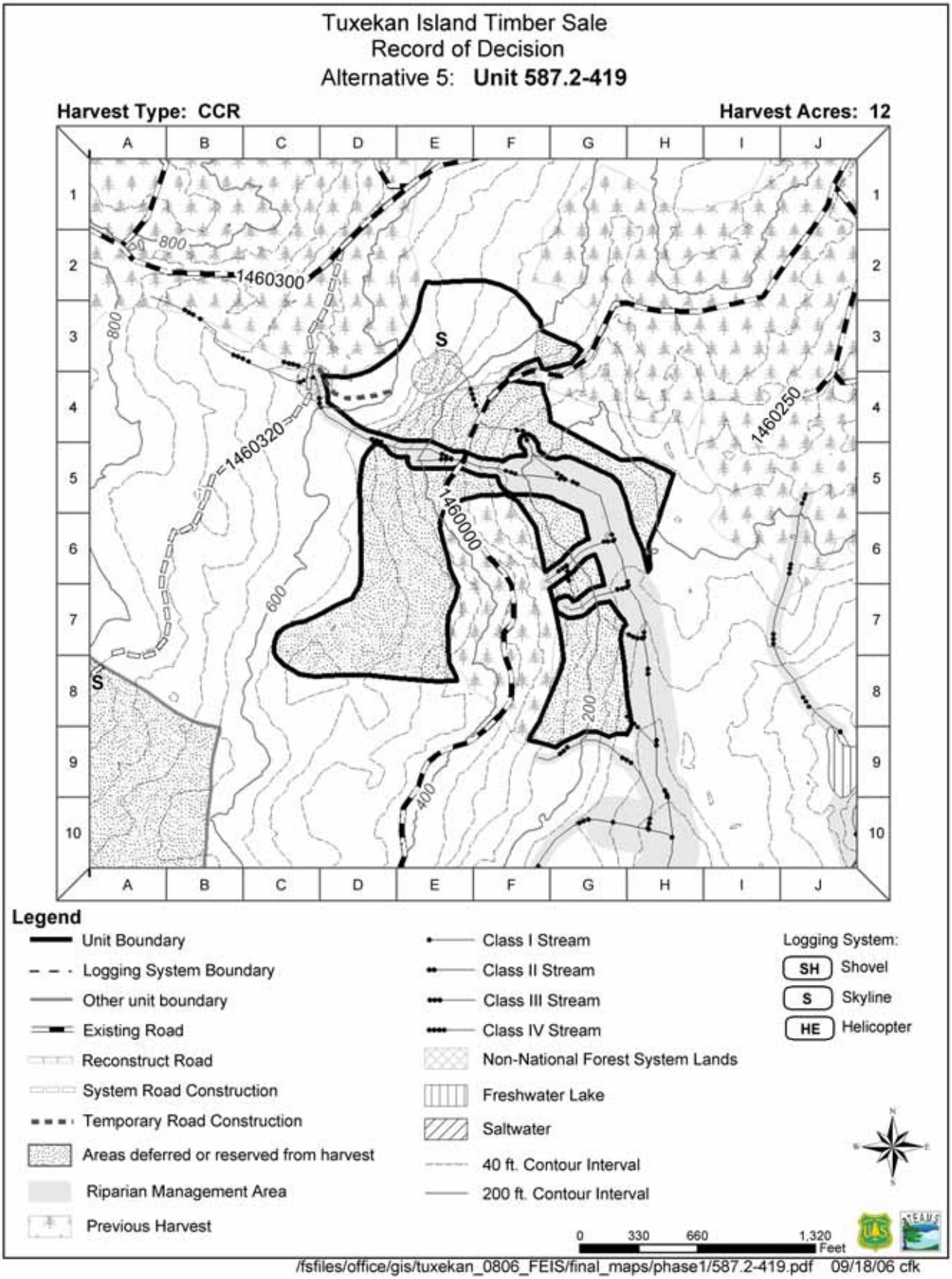
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-419 Quad Map: Craig D-4 **Photo #:** 00-12-5 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 331
Total Planned Acres:63 **Harvest Acres: Alt 5:** 12

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 13
Volume Strata:Low: 0 **Medium:** 0 **High:** 63 **Slopes >72% harvest:** 1
Streams Class I: 0 **Class II:** 2 **Class III:** 4 **Class IV:** 3

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the entire unit is two. Minimum partial harvest in areas greater than 72% slope to minimize soil displacement. Forested wetlands were not identified within the unit on the Forest Service wetlands map. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 710 **Forested wetland (%area):** 0
Soil Type: 28 (10%), 442CE (90%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Tailtrees required. Some machine anchor tailholds may be necessary adjacent to previously harvested unit on north boundary. Leave trees standing on slopes >72% below the landing and cut corridors through the steep area. Approximately 500 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Construction of new 1460320 road required. Road 1460000 is located within the unit.

Fish/Watershed
One Class II/III stream bisects this unit, with several Class III streams feeding into it.

Loc: D4-G4 Stream 1: HC5/III portion requires RMA buffer defined as V-notch (side-slope break), plus 25' RAW buffer. This stream flows from the northwest corner of the unit and becomes a Class II about ½ way through the unit.

Loc: G5 Stream 1: HC2/II portion requires no-cut RMA buffer: 100', plus RAW buffer of 75'. This portion of the stream flows east through the middle of the unit, joining the next tributary (about 300'); at this point the stream becomes an MM1 channel.

Loc: G5-H9 Stream 1: MM1/II portion requires no-cut RMA buffer: 120', plus RAW buffer of 75'. This portion of the stream begins where the Class III stream joins and continues flowing south.

Loc: G6 Stream 2: HC5/III requires RMA buffer defined as V-notch (side-slope break), plus 25' RAW buffer. This stream flows west to east into Stream 1.

Loc: G6 Stream 2.1: HC5/IV. No RMA buffer. This stream flows into Stream 2 from the south.

Loc: G7 Stream 3: HC5/III, requires RMA buffer defined as V-notch (side-slope break), plus 25' RAW buffer.

Loc: H7 Stream 5: HC5/IV. No RMA

Loc: H8 Stream 6: HC5/IV. No RMA

Loc: F9-H9 Stream 7: HC5/III, requires RMA buffer defined as V-notch (side-slope break), plus 25' RAW buffer.

Identify and flag Class II, III and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, 13.16, 14.6, 14.14, 14.17, and 14.22.

Wildlife

Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. RMA in the southern and central portion of the unit is also counted as reserve area. According to TPIT guidelines, RMAs along Class I and II streams that protrude into timber harvest units as peninsulas can contribute to marten and goshawk Standards and Guidelines.
High Value Habitat - Deer: Harvest Area 12 acres; No Cut Area 51 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

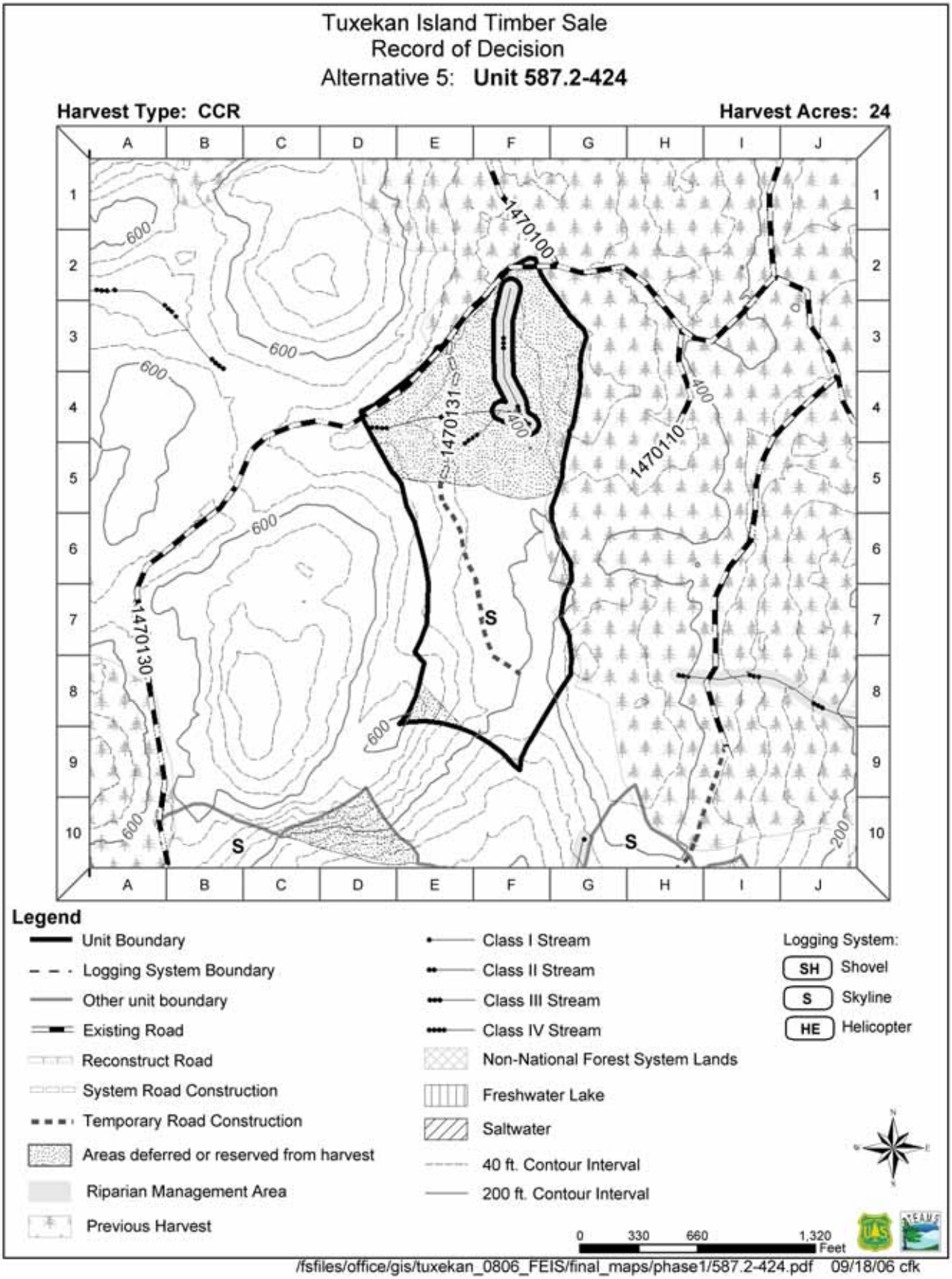
Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily of moderate vulnerability with inclusions of high vulnerable karst areas. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. Several areas of high vulnerability karst were discovered during inventory and unit layout and have been removed from the unit and/or buffered by a 100-foot no-harvest buffer plus wind firmness and slope break. Additional high vulnerability areas to the west have been removed. In the DEIS, both the NFS and temporary roads accessing the unit cross ephemeral karst streams. The temporary road as currently flagged on the ground crosses close to a karst resurgence. In the FEIS, the road was relocated to the north to ensure that a 100ft buffer is implemented, as required, to protect this feature (Baichtal, 2005c, North, 2006). If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24). If the temporary road portion of the road can not be re-aligned to avoid the high vulnerability feature then disturbance during construction should be kept to a minimum. If the road must be built above this feature the following mitigation will be applied: Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8). Use a fill-type construction rather than a balanced cut and fill design. These most likely will be possible since the slope gradient of these areas is generally >15% (SGVA2, 8: BMP14.8). Sediment traps and erosion control measures should be installed and maintained where the road is adjacent to the significant karst feature (SGVA2, 8: BMP14.8). Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8). A “plan-in-hand” review of the proposed road construction prior to actual construction is required.

Silvicultural Input:
High windthrow hazard. Most of the southern half of the unit appears even aged and probably originated from a single wind event. The remainder contains small scale gaps more indicative of small scale wind disturbances. Basal area is 320 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Small Slackline

Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-424 Quad Map: Craig D-4 **Photo #:** 00-12-7 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 982
Total Planned Acres:48 **Harvest Acres: Alt 5:** 24

Forest Type: Western Hemlock-Poorly Drained **RMA (acres):** 0
Volume Strata:Low: 0 **Medium:** 0 **High:** 47 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 0 **Class III:** 1 **Class IV:** 2

Soils Input:
Slopes throughout the unit generally ranged from 30 to 65%. The soil on the slopes in the unit appears relatively stable. Steeper slopes in the upper elevations consist of moss layers overlying limestone with little underlying soil development. Shallow soils, low angle slopes, and undulating topography indicated no specific slope instability in the unit. A minimum of partial or full log suspension on slopes in excess of approximately 72% is recommended to minimize soil displacement. No wetlands present; no concerns. Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.
Plant Association: 110 **Forested wetland (%area):** 0
Soil Type: 442CE (96%), 20CDX (4%) **Non-forested wetland (%area):** 0

Timber Input:
Cable logging. Partial log suspension required (BMP 13.9). Tailtrees required. Approximately 1,220 feet of temporary road needed. Decommission temporary roads within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24.

Engineering
Construction of new 1470131 road required.

Fish/Watershed

There is one Class III stream and two Class IV streams in this unit.
Loc: F3-4 Stream 1: MM1/III requires an RMA buffer: 50' plus 25' RAW buffer. This stream flows south from the northeast unit boundary.
Loc: E5 Stream 2: MM1/IV no RMA. Yard away from stream to reduce slash.
Loc: F5 Stream 3: MM1/IV no RMA. Yard away from stream to reduce slash
Identify and flag Class III and IV streams during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. High Value Habitat - Deer: Harvest Area 24 acres; No Cut Area 24 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. No inventoried recreation places are located within or adjacent to the unit. Established subsistence recreation use occurs within the project area. Unit is visible in the background from the West Coast Kayak and Skiff Route. Unit is also visible in the middleground from Viewpoint 1 (Nichin Cove). Prescription meets maximum modification VQO; no concerns.
VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. Under the DEIS, the northern half of the unit is mapped as high vulnerability karst. The URS Karst Vulnerability Resource Report and field reconnaissance found that this area was mostly moderate vulnerability karst with two high vulnerability features and the streams that flow into them. In the FEIS, the polygon within the karst vulnerability layer of the Tuxekan Project was coded to reflect the moderate vulnerability karst verified during field layout. The karst features within this northern portion of the unit were buffered with a minimum 100-foot no-harvest buffer plus reasonable assurance of windfirmness. In the FEIS the high vulnerability karst remains in the reserve area. Areas of high vulnerability are an adequate distance from the proposed access road to require no further buffer. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8). For temporary roads ensure that road drainage is designed in such a manner that sediment and road associated drainage does not reach any karst feature (BMP 14.3, SGVA8); any culverts needed will be designed under the guidelines of BMP 14.17 ; ensure that all culverts, rolling dips, or relief culverts are adequately designed and maintained to prevent blockage of the culvert or diversion of road associated surface waters (BMP, 14.5, 14.9, 14.20; SGVA2, 8); Sediment traps and erosion control measures may be required. If constructed, sediment traps should be maintained (BMP 14.8); Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (BMP14.8; SGVA 2, 8); Pull culverts when road is closed (BMP 14.24).

Silvicultural Input:
High windthrow hazard. Southeast portion of the unit appears even age, probably originated from a single wind event. The remainder contains small to medium scale gaps indicative of small scale stem snap and/or small group windthrow events. Basal area is 236 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Running Skyline

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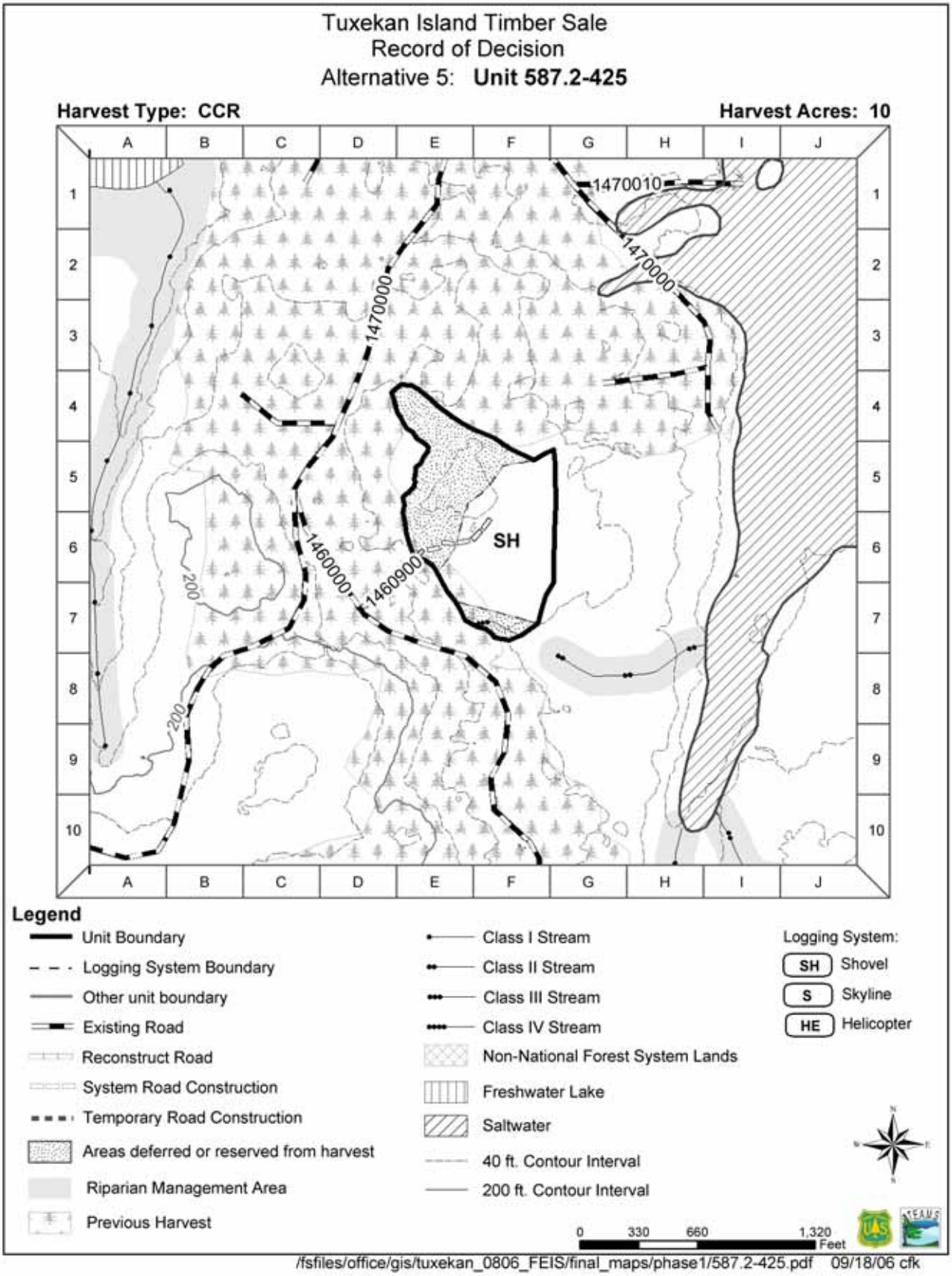
Appendix 1 – Unit Cards



Tuxekan Island ROD - Unit Card - Planned Configuration

Unit #: 587.2-425 Quad Map: Craig D-4 **Photo #:** 00-13-7 **WAA:** 1531
Alternatives: 2, 3, 4, 5 **Estimated Volume: Alt 5:** 224
Total Planned Acres:20 **Harvest Acres: Alt 5:** 10

Forest Type: Western Hemlock and Redcedar-Well Drained **RMA (acres):** 0
Volume Strata:Low: 1 **Medium:** 17 **High:** 0 **Slopes >72% harvest:** 0
Streams Class I: 0 **Class II:** 1 **Class III:** 0 **Class IV:** 1

Soils Input:
Slopes within the unit are less than 72%. The mass movement index (MMI) for the western half is three while the remainder is rated two. Minimum partial suspension for portion of unit rated MMI three. Approximately 0.3 acres of forested wetlands are present (BMP 12.5). Proposed harvest areas have no slopes >72% with contiguous acreage over 1 acre. BMPs include 12.17, 13.5, 13.9, 13.10, 13.11, 13.14, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, 14.19, and 14.22.

Plant Association: 710 **Forested wetland (%area):** 0.3 acres (2%)
Soil Type: 20CDX (4%), 442CE (96%) **Non-forested wetland (%area):** 0

Timber Input:
Shovel logging. Partial log suspension required (BMP 13.9).

Engineering
Construction of new 1460900 road required.

Fish/Watershed
One small Class IV in the south end of the unit.
Loc: F7 Stream 1: HC2/IV. No RMA. Yard away from stream to reduce slash in stream.
Loc: G8-H8 Stream 2: HC2/II requires no-cut RMA buffer: 100', plus RAW buffer of 75'. This stream is located just outside of the southeast boundary.
Identify and flag Class IV stream during layout. BMPs include 12.4, 12.6, 12.6a, and 13.16.

Wildlife
Reserves contain at least 50% of original unit; therefore, >/=30% canopy closure will be maintained per marten and goshawk standards and guidelines. Based on goshawk observations in the area during the summer of 2005, additional surveys to determine occupancy/ nesting will be done prior to implementation. High Value Habitat - Deer: Harvest Area 20 acres; No Cut Area 20 acres.

Recreation/Scenery
No registered recreation sites are found within the proposed project area. Unit is within or adjacent to the inventoried recreation place locate near Nichin Cove. Established subsistence recreation use occurs within the project area. Unit is visible in the middleground and background from the West Coast Kayak and Skiff Route. Prescription meets maximum modification VQO; no concerns.

VQO: Maximum Modification **ROS:** Roaded Modified

Lands Input: No state, private, or encumbered lands are near or adjacent to the unit.

Heritage Unit has no adverse effect on cultural resources.

Geological Input:
Unit is completely underlain by limestone into which karst drainages have developed. The karst in the unit is primarily moderate vulnerability with areas of low vulnerability where glacial till is thickest. Partial suspension is required in the moderate vulnerability areas to protect shallow mineral and organic soils. One high vulnerability karst area was discovered adjacent to the temporary road accessing the unit as initially planned. The NFS road alignment was shifted north in the FEIS to provide a greater than 100 foot buffer to the area. Wind firmness is not an issue because the buffer lies in the middle of a 30 year

old second growth stand. If additional significant features are identified during unit layout, the Forest Geologist will be contacted to determine the appropriate mitigation measures (BMPs 13.2, 13.3, 13.9, 13.16, 14.19; Standards and Guidelines for Karst: VA2, 3, 4, 5, 6, 7, and 8).

Silvicultural Input:
Moderate windthrow hazard. Small to medium scale gaps throughout stand indicates stem snap and/or small group windthrow events. Basal area is 240 sq ft per acre. 10% retention between groups must be protected by unit design and layout, or by appropriate contract provisions, or both. The 10% retention should be reasonably windfirm so that it can remain on site for most of the rotation.

Alternative 5: CCR by Shovel

Appendix 2 - Road Cards

Appendix 2 – Road Cards

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Road Management Objectives

Purpose and Use

The Road Management Objectives (RMOs) presented in this appendix establish the intended purpose and the display design, maintenance, and operation criteria (per FSH 7709.55) for proposed and existing roads within the Tuxekan Project Area. Site-specific design criteria are discussed in the second section of the RMOs; these would be used during design, construction, and initial monitoring of any road work proposed in this document. For proposed roads, a map is also included, showing the proposed road location and identification of areas discussed in the site-specific design criteria. Site-specific design criteria include road location objectives, wetland information, erosion control, and proposed rock borrow sources.

General Design Criteria

The general design criteria provide various descriptions of the type of road and the intended purpose and future use of the road. Three Functional Classes are used by the Forest Service. They are Arterial, Collector, and Local. Arterial roads function as mainlines with collectors feeding traffic to arterials and locals feeding traffic to collectors. Service Life indicates duration of road use. Choices are Short-term (less than 10 years) or Long-term. Long-term is used in conjunction with the entry cycle. The choices are Long-term Constant or Long-term Intermittent. The roads on the island are listed as Long-term Intermittent (LI). Maintenance and operation criteria are developed from functional class, service life and other general design criteria.

Maintenance Criteria

The maintenance criteria include a discussion of how the road is to be maintained, centering on three strategies. Corresponding Alaska Forest Practices Act (AFPA) terminology is shown in the Chapter 3 Transportation section. The three maintenance strategies are:

Active: Provide frequent cleanout of ditches and catch basins to ensure controlled drainage. Control roadside brush to maintain sight distance. Grade as needed to maintain crown and running surface.

Stormproof: Provide water bars, rolling dips, out sloping, etc., to ensure controlled runoff until any needed maintenance can be performed on the primary drainage system. Control roadside brush to maintain passage.

Storage: Remove or bypass all drainage structures to restore natural drainage patterns; add water bars as needed to control runoff; revegetate.

Maintenance levels and traffic service levels are discussed in the FEIS, Chapter 3, Road Management. The operational maintenance level is the current or planned condition and is the level during timber harvest. Objective maintenance level is the desired future condition after harvest activities are completed.

Because there is no permanent community on Tuxekan Island, the **active** maintenance strategy is applied to roads open and maintained for travel by a prudent driver in a high clearance vehicle. User comfort and convenience are not considered priorities. These roads are assigned Maintenance Level 2.

An intermediate maintenance strategy is to **stormproof**, or stabilize, the road by providing roadway features, such as drivable water bars, and out sloping to control runoff in case the primary drainage system of culverts and ditches is overwhelmed during a storm event. Each culvert would be evaluated as to where the water would go if the culvert were to fail to carry the high flow. A water bar or out slope at this location would minimize the potential of erosion of long stretches of ditch line or roadway. These roads are also assigned Maintenance Level 2.

Storage is intended to be the primary maintenance strategy on intermittent use roads during their closure cycle. Road storage is defined in FSH 5409.17 as the "the process/action of closing a road to vehicle traffic and placing it in a condition that requires minimum maintenance to protect the environment and preserve the facility for future use." In this strategy, bridges and culverts on live streams are completely removed to restore natural drainage patterns. Cross drains and ditch relief culverts would be bypassed with deep water bars but may be left in place to minimize the cost of reusing these roads in the future. Roads in storage are left in a self-maintaining state in order to use more road maintenance funds on the open drivable roads on the island. Maintenance Level 1, closure and basic custodial maintenance, is assigned.

Operation Criteria

The operation criteria include a presentation of each of the five traffic management strategies identified in FSM 7731 (encourage, accept, discourage, prohibit, and eliminate) to be applied to different traffic classes on each road. The traffic management narrative describes what actions would be taken in order to apply each strategy. For example, if the strategy "eliminate" is prescribed for standard passenger and high-clearance vehicles, the narrative describes the method to accomplish this, such as removal of stream crossing structures, gating, etc. Travel management strategies were discussed in greater detail in the FEIS, Chapter 3, Road Management.

Site-specific Design Criteria

The site-specific design criteria include road location objectives, wetland information, erosion control, proposed rock borrow sources, and all streams within the project area with proposed construction or rehabilitation of stream crossing structures. The road location discussion documents why the road is proposed in a specific location, control points, and alternative routes considered (if any). A main location objective is to avoid crossing wetlands. At times, however, it is necessary to cross wetlands in order to minimize the total impact of a road. These areas are discussed, documenting areas of mapped wetlands and why the road is located across these areas. All fish streams are identified, as well as nonfish streams with sufficient flow to require a 48-inch or larger culvert. The stream crossing information describes the stream in enough detail to lead to a preliminary crossing structure recommendation and to evaluate the adequacy of the proposed structure.

Other Resource Information

The resource information section presents issues of concern (if any) for the following categories: timber/logging systems, wildlife, visual/recreation, cultural, lands/minerals/geology/karst, and soils/water. For proposed roads, potential concern exists for lines that pass through high-value deer habitat, medium- or high-vulnerability karst, or soils with a mass movement index ranking of 4 (MMI 4 soils). For existing roads, potential concern focuses on karst and soil issues.

Wildlife

There are 21 existing rock pits within ½ mile of the shoreline (see attached map). If active bald eagle nests are found along the shoreline adjacent to any of these pits that would be used and require blasting, mitigation would be considered and applied where needed to reduce the potential for disturbance. Shoreline surveys are not necessary if blasting occurs outside of the nesting season (August 31 to March 1). Any restrictions placed on blasting may be removed if the eagle nest(s) becomes inactive after May 31 of the nesting season.

Appendix 2 – Road Cards

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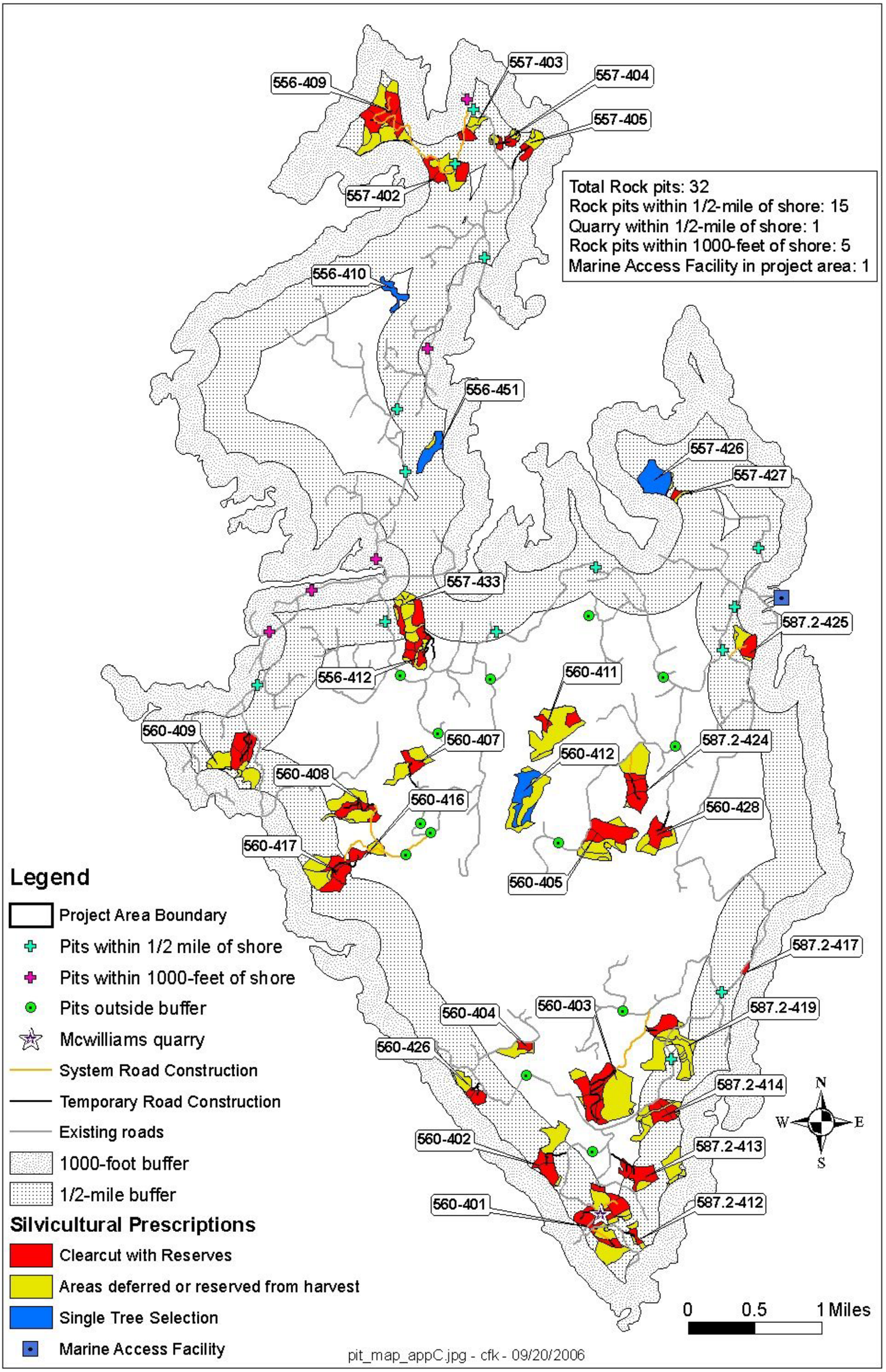

Figure 2-1. Existing rock pits within ½ mile of the shoreline

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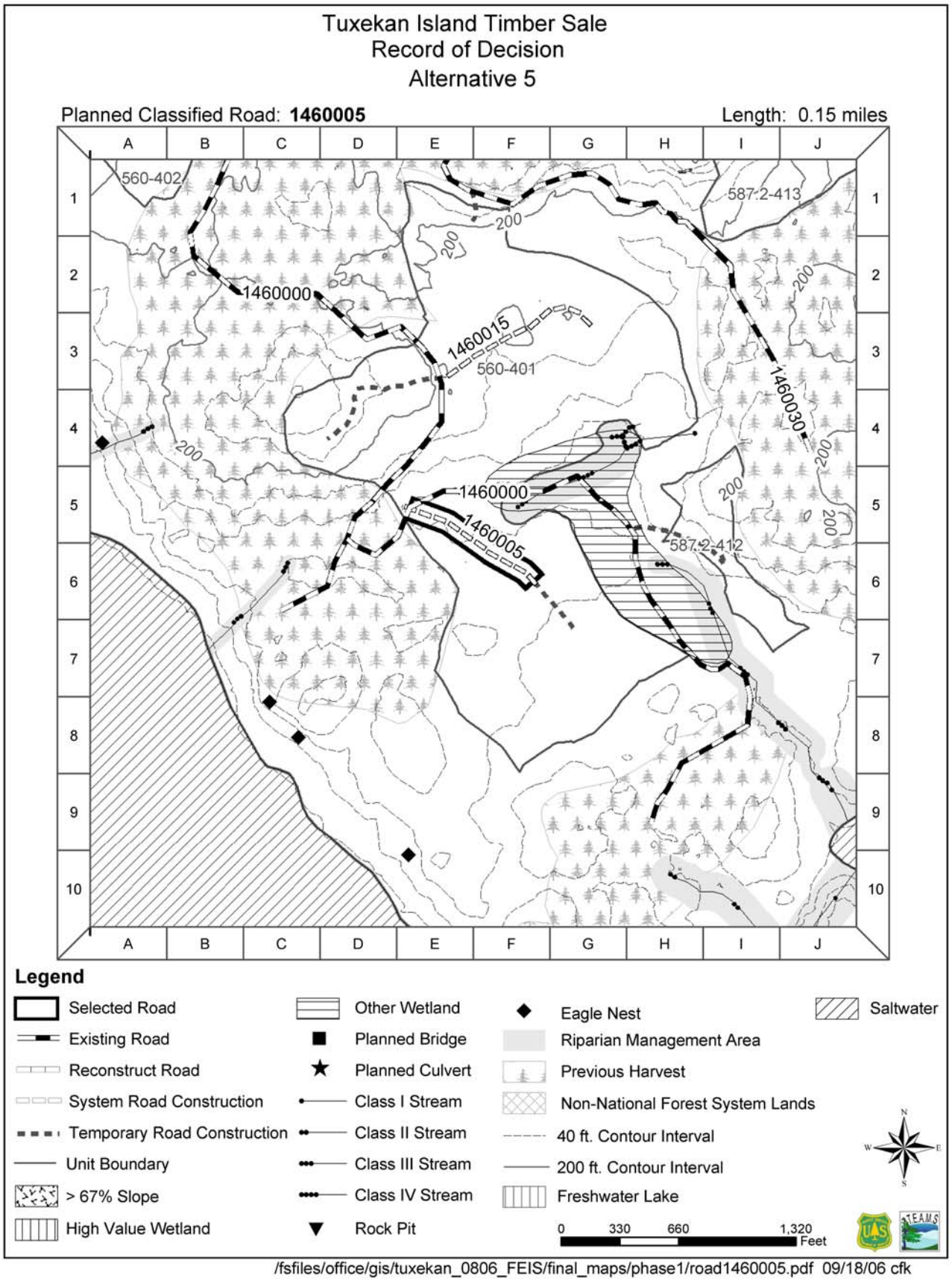

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1460005 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1460-005	Winter view		MP 0.69 Road 1460-000	MP 0.15
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.15mi.	Planned	CRAIG D-4 SW	1991, 1990, 89-90

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	0.15	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies	**Encourage:**	
	Accept:	Hikers
	Discourage:	
	Prohibit:	
	Eliminate:	Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at MP 0.00, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1460005

ROAD LOCATION: The route was selected to access Unit 560-401. No significant karst features would be used for disposal of construction related debris (SGVA7). A temporary road continues on to landings.

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock to begin construction is available at an existing quarry located at MP 2.2 along the 1460000 Road. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48" structure or larger occur along this road alignment.

OTHER RESOURCE INFORMATION (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

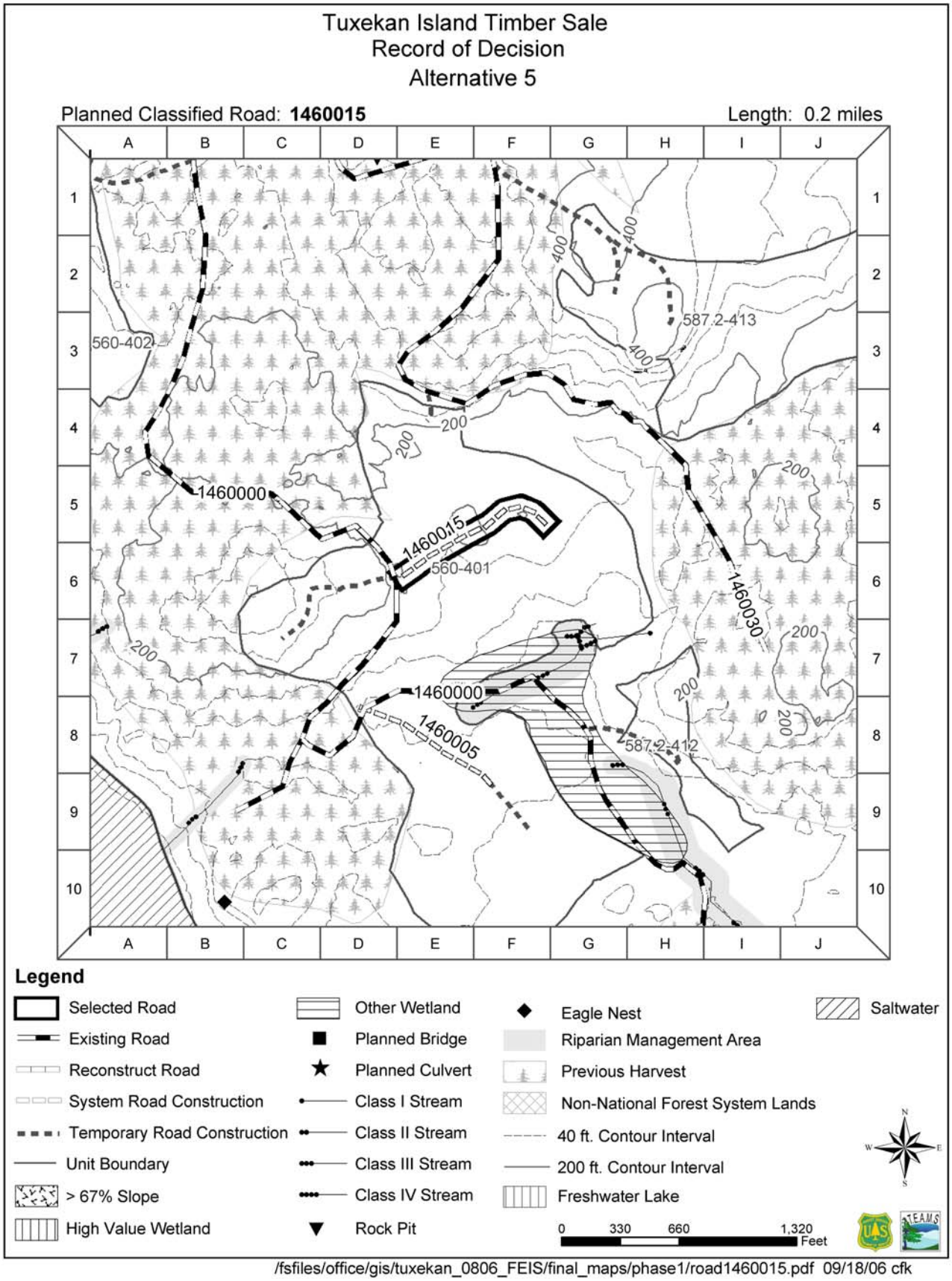
LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst. The following mitigation measures are required on moderate vulnerability karst:

- Existing quarries and roads would be utilized in preference to the construction of new ones.
- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. During road relocation, if unforeseen questions arise, the Forest Geologist and road engineer would be consulted for any additional concerns, but especially for culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, 14.20).

- No quarry shall be developed atop karst without consulting with the Forest Geologist, adequate site survey and design, and obtaining their approval for the quarry (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

SOILS/WATER: Please see EROSION CONTROL section.

Appendix 2 – Road Cards



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1460015 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1460-015	Madison		MP 1.04 Road 1460-000	MP 0.20
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.20mi.	Planned	CRAIG D-4 SW	1991, 1990, 89-90

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	0.20	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies

Encourage:

Accept: Hikers

Discourage:

Prohibit:

Eliminate: Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at MP 0.00, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1460015

ROAD LOCATION: The route was selected to access Unit 560-401. In the FEIS the NFS road to access the landing in the northeastern portion of the unit has been relocated southward to the ridge top to avoid closed basin to the north (SGVA 2, 3, and 8). A temporary road continues on to landings. No significant karst features would be used for disposal of construction related debris (SGVA7).

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock to begin construction is available at an existing quarry located at MP 2.2 along the 1460000 Road. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48" structure or larger occur along this road alignment.

OTHER RESOURCE INFORMATION (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst. The following mitigation measures are required on moderate vulnerability karst:

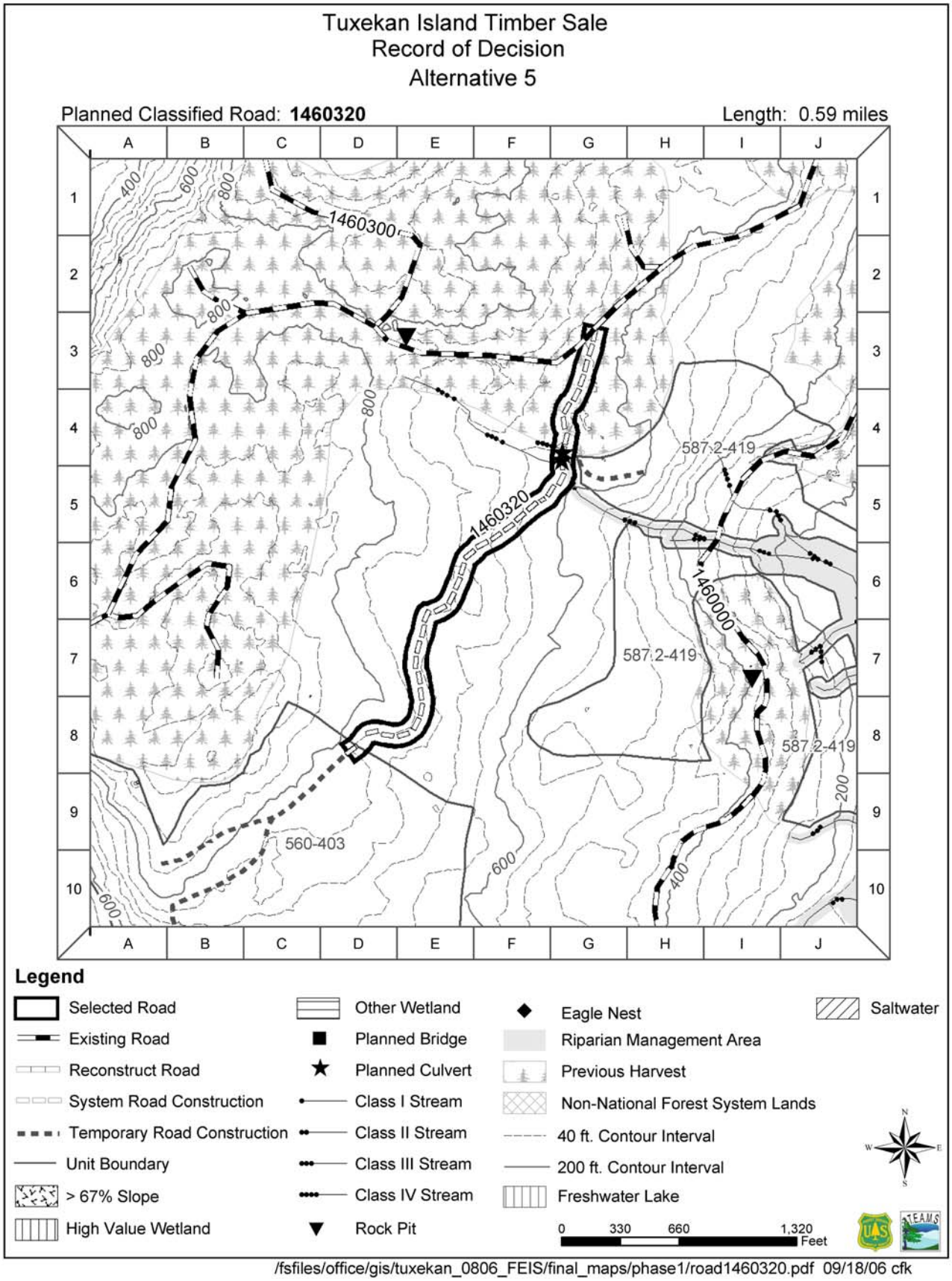
- Existing quarries and roads would be utilized in preference to the construction of new ones.
- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. If road can not be rerouted the Forest Geologist and road engineer would be consulted regarding culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, 14.20).

- No quarry shall be developed atop karst without consulting with the Forest Geologist, adequate site survey and design, and obtaining their approval for the quarry (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

Following road location, additional design criteria may be required relating to road construction methods, blasting, culvert placement, sediment retention and erosion prevention.

SOILS/WATER: Please see EROSION CONTROL section.

Appendix 2 – Road Cards



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1460320 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1460-320	Lumpy		MP 1.02 Road 1460-300	MP 0.59
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.59mi.	Planned	CRAIG D-4 SW	1991, 1991, 90-91

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	0.59	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies	**Encourage:**	
	Accept:	Hikers
	Discourage:	
	Prohibit:	
	Eliminate:	Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at MP 0.00, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1460320

ROAD LOCATION: The road was located to permit access to Units 560-403 and 587.2-419, as well as potential future landings located between the units. Road leaves 1460-300 road at an existing landing, dropping 5 stations at 10% adverse through a regenerating clearcut, to access Unit 587.2-419. Road climbs through karst at favorable grades of 10-15% for 850 feet, following benches where possible. A further 1550 feet of karst is traversed by a gentle rising, rolling grade. Some rock blasting would be required. The road passes through moderate vulnerability karst and is at times adjacent to high vulnerability karst. Placement of construction debris would be controlled to minimize impacts to karst. It should be moved as far north as practical to minimize impacts to the high vulnerability karst feature (Baichtal 2005c).

Primary control is exerted by:
Junction with proposed temporary spur to Unit 587.2-419.
Bench above spring, between rock outcrops, station 8+00.
Landing location in Unit 560-403, station 30+90.

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock to begin construction is available at an existing quarry located at MP 1.25 along the 1460300 Road. Rock is exposed, indicating pit development potential, at sta. 5+50 and elsewhere. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48” structure or larger occur along this road alignment.

1.)

Station:	07+54	**Stream Class:**	IV	**Channel Type:**	HC2		
B.F. Width:	3’	**B.F. Depth:**	2”	**Gradient:**	6%	**Substrate:**	Gravel
Structure:	<48” CMP						

NARRATIVE:

2.)

Station:	07+92	**Stream Class:**	IV	**Channel Type:**	HC2		
B.F. Width:	2’	**B.F. Depth:**	1.5”	**Gradient:**	9%	**Substrate:**	Cobble
Structure:	<48” CMP						

NARRATIVE:

OTHER RESOURCE INFORMATION (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst and adjacent to high vulnerability karst. The following mitigation measures are required on moderate vulnerability karst:

- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. During road relocation, if unforeseen questions arise, the Forest Geologist and road engineer would be consulted for any additional concerns, but especially for culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- If road can not be rerouted the Forest Geologist and road engineer would be consulted regarding culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, 14.20).
- No quarry shall be developed atop karst without consulting with the Forest Geologist and adequate site survey and design (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

For construction on or adjacent to high vulnerability karst land or features the following mitigation is required:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8).
- Use a fill-type construction rather than a balanced cut and fill design. These most likely would be possible since the slope gradient of these areas is generally > 15% (SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained where the road is adjacent to the significant karst feature (SGVA2, 8: BMP14.8).
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A "plan-in-hand" review of the proposed road construction prior to actual construction is required.
- The original buffer between CAV 419 and RS419 is too small and must be increased (SGVA 4, 5). Consult with the Forest Geologist.

If the temporary road portion of the road can not be re-aligned to avoid the high vulnerability feature then disturbance during construction should be kept to a minimum. If the road must be built above this feature the following mitigation would be applied:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8).
- Use a fill-type construction rather than a balanced cut and fill design. These most likely would e possible since the slope gradient of these areas is generally > 15%(SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained where the road is adjacent to the significant karst feature (SGVA2, 8: BMP14.8).
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A “plan-in-hand” review of the proposed road construction prior to actual construction is required.

SOILS/WATER: Please see EROSION CONTROL section.

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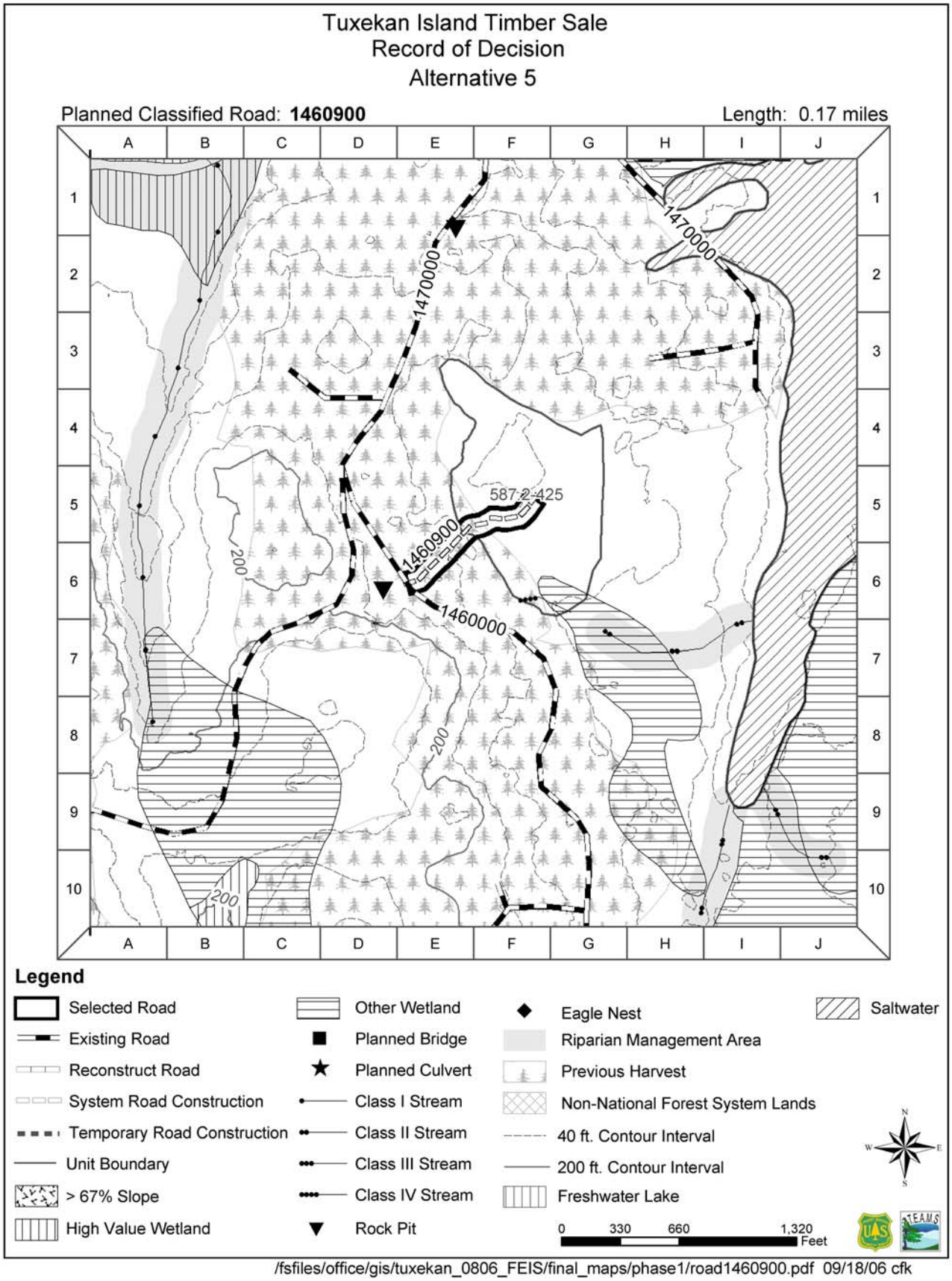

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1460900 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1460-900	Geo		MP 7.71 Road 1460-000	MP 0.17
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.17mi.	Planned	CRAIG D-4 SW	1991, 1990, 94-95

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	0.17	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies	**Encourage:**	
	Accept:	Hikers
	Discourage:	
	Prohibit:	
	Eliminate:	Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at MP 0.00, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1460900

ROAD LOCATION:
The route was selected to access logical landings in Unit 587.2-425. In the FEIS the NFS road location has been moved to allow for a greater than100 ft buffer between the karst feature and road (SGVA 4). The route crosses low vulnerability karst. The NFS road location has been moved, creating a >100 ft buffer between the cave and road (Baichtal, 2005c). No significant karst features would be used for disposal of construction related debris (SGVA7).

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock to begin construction is available at an existing quarry located at MP 7.78 along the 1460000 Road. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48" structure or larger occur along this road alignment.

OTHER RESOURCE INFORMATION (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: No concerns.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst. The following mitigation measures are required on moderate vulnerability karst:

- Existing roads and quarries would be utilized in preference to the construction of new ones.
- The Forest Geologist would approve quarry locations.
- Roads shall, to the extent feasible, avoid sinkholes and other collapse features and losing streams (bmp 14.7, SGVA 2, 3, 4, 8).
- Roads should not divert water to or from karst features (SGVA 3).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP'S 14.18, 14.20, 14.9).

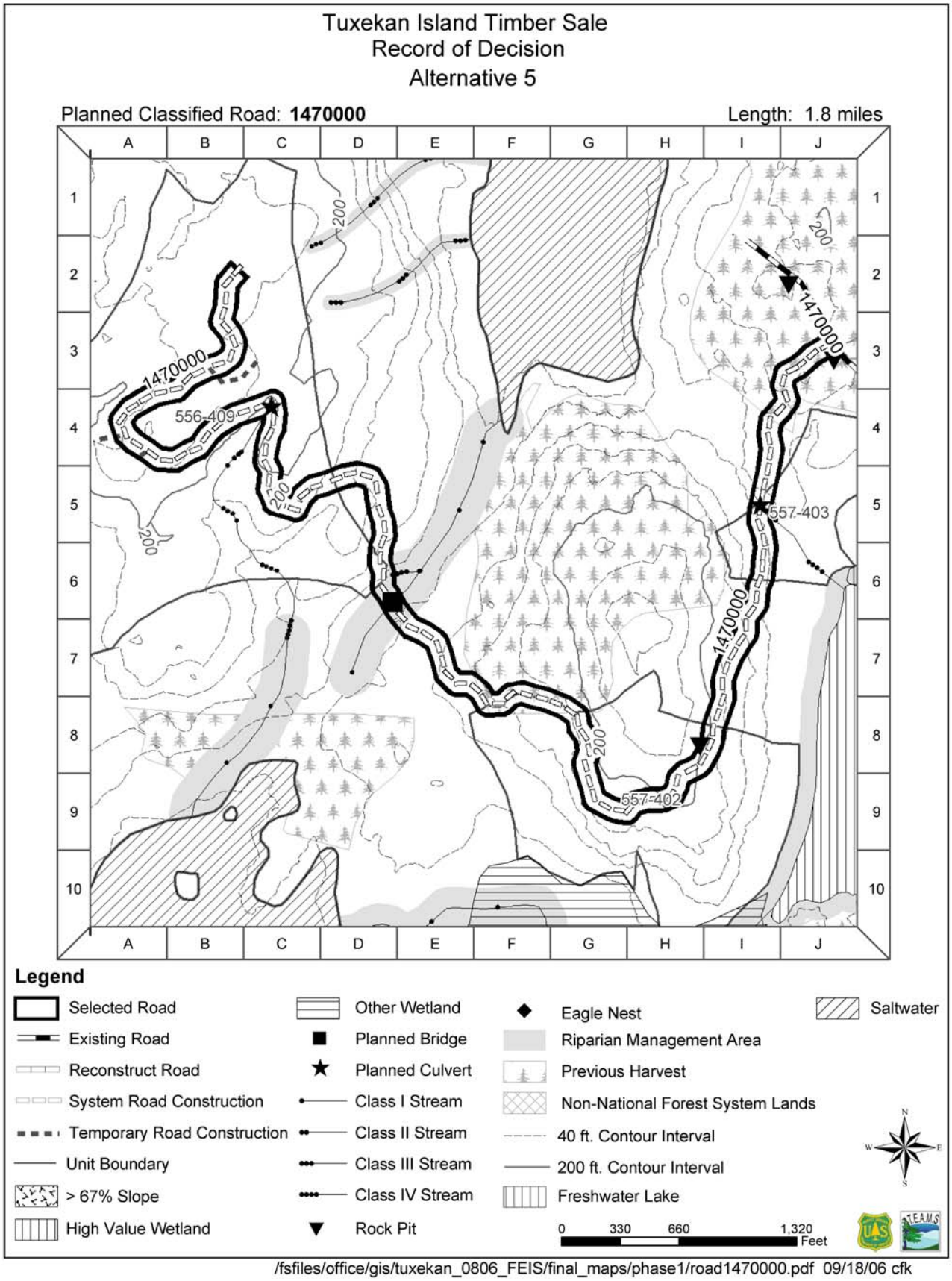
- Sediment traps and cut and fill slope seeding are required as soon as feasible (BMP 14.18).
- No quarry shall be developed atop karst without adequate site survey and design (SGVA 3, 8, 9, bmp 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

Following road location, additional design criteria may be required relating to road construction methods, blasting, culvert placement, sediment retention and erosion prevention.

Any blasting conducted would conducted only after careful design has ensured that seismic shock would not affect any fragile cave formations, destabilize cave passages or alter groundwater flow into the cave. Individual shots shall be designed to minimize overshot materials to prevent vegetation damage or destruction. Blasting plan must require before and after monitoring of the blasting site and adjacent areas to ensure that flow and vegetation have not been altered (SGVA8, BMP 14.7).

SOILS/WATER: Please see EROSION CONTROL section.

Appendix 2 – Road Cards



1470000 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1470-000	North Beach		MP 10.5 Road 1470-000	MP 1.81
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	1.81mi.	Planned	CRAIG D-4 NW	1991, 790, 45-46

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	1.81	2	1	D	Closed

Maintenance Narrative

Storage: Remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies	**Encourage:**	
	Accept:	Hikers
	Discourage:	
	Prohibit:	
	Eliminate:	Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at MP 0.00, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1470000

ROAD LOCATION: The route was selected to access logical landings in Units 557-403, 557-402, and 556-409. In the FEIS in order to avoid a karst buffer near the start it is necessary to encroach slightly upon the beach buffer in second growth forest, starting the location from an existing unauthorized road to accomplish this. Grades of 15% favorable and 12% adverse are necessary in a few places to connect to control points, encroaching slightly again on the beach buffer east of Unit 556-409. Unit 557-402 consists of moderate vulnerability karst with the top of the ridge, above the flagged road location, having a high vulnerability karst feature. In the FEIS the road has been relocated 50 ft to the south (downslope) of a 12x8ft sinkhole where it can be constructed using overlay techniques and no blasting would be required (North, 2005b). No significant karst features would be used for disposal of construction related debris (SGVA7).

Primary control is exerted by:
Junction with existing spur off of the existing 1470 line.
Buffer around sinkhole to north of Unit 557-403.
Landing 1 in Unit 557-403 at the base of the side hill.
Saddle in Unit 557-402.
Station 33+71, top of cliffs, end of bench.
- Crossings at stations 50+65 and 16+71.

The only construction issues are the 130 feet of wet ground between sta. 8+40 and 9+70, and in the 500 feet of the road before the bridge at station 50+65. In the latter location, there is a 35-foot bridge required for the crossing at station 50+65 leading to a large rock cut used to fill over a class IV stream. The 200 feet of construction before the bridge is full bench. Segments of 14% and 15% grades are required to connect preferred landings with benches and saddles.

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock is exposed, indicating pit development potential, at sta. 0+00, 23+00 – 28+00, and elsewhere. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS:

1.)

Station:	16+71	**Stream Class:**	IV	**Channel Type:**	HC2		
B.F. Width:	2.5’	**B.F. Depth:**	6”	**Gradient:**	6%	**Substrate:**	Cobble
Structure:	<48” CMP						

2.)

Station:	50+65	**Sream Class:**	I	**Channel Type:**	MM1		
B.F. Width:	3'	**B.F. Depth:**	6"	**Gradient:**	3%	**Substrate:**	Organic
Structure:	35' MB						

NARRATIVE: The Class I stream crossed by the road is a small, low gradient stream with primarily an organic substrate with patches of small gravel and sand and limited spawning habitat. Dolly Varden and cutthroat trout presence verified, coho presence not verified. There are no apparent permanent barriers to salmon migration. The instream work timing for this stream is June 25 through September 1 (BMP 14.6). Bridge design and installation should follow water quality management BMPs (13.16, 14.5, 14.11, 14.14, 14.15, 14.17, and 14.19). Recommended log stringer bridge.

3.)

Station:	70+24	**Stream Class:**	IV	**Channel Type:**	HC5		
B.F. Width:	1'	**B.F. Depth:**	6"	**Gradient:**	15%	**Substrate:**	Bedrock
Structure:	18" CMP						

OTHER RESOURCE INFORMATION (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst and 50 feet down slope of a karst feature. The following mitigation measures are required on moderate vulnerability karst:

- Existing quarries and roads would be utilized in preference to the construction of new ones.
- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. During road relocation, if unforeseen questions arise, the Forest Geologist and road engineer would be consulted for any additional concerns, but especially for culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, 14.20).
- No quarry shall be developed atop karst without consulting with the Forest Geologist, adequate site survey and design, and obtaining their approval for the quarry (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

For construction on or adjacent to high vulnerability karst land or features the following mitigation may be required:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8).
- Use a fill-type construction rather than a balanced cut and fill design. These most likely would e possible since the slope gradient of these areas is generally > 15%(SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained where the road is adjacent to the significant karst feature (SGVA2, 8: BMP14.8).
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A “plan-in-hand” review of the proposed road construction prior to actual construction is required.

SOILS/WATER: Please see EROSION CONTROL section.

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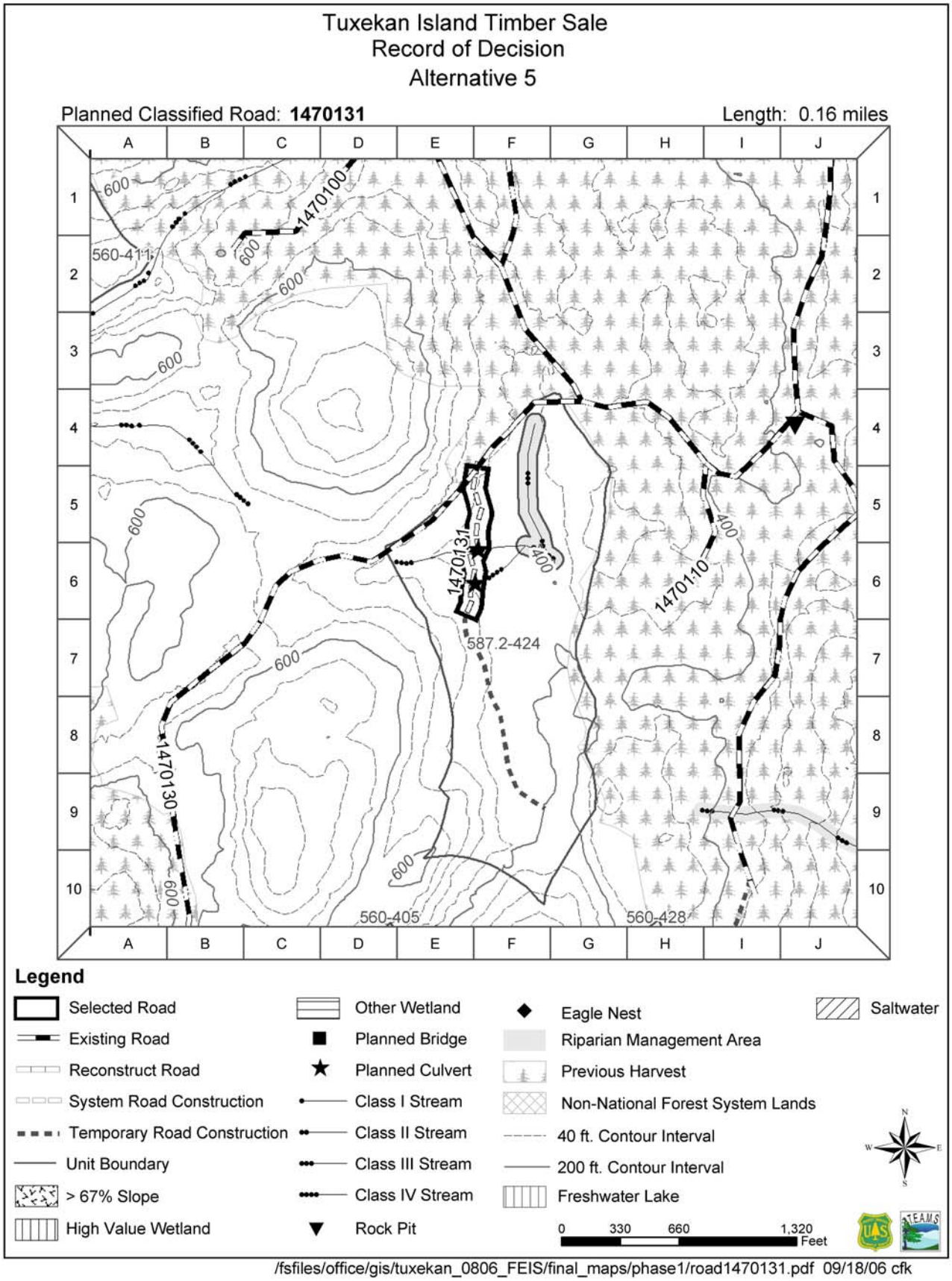

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1470131 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1470-131	Bumpy		MP 0.09 Road 1470-130	MP 0.16
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.16mi.	Planned	CRAIG D-4 SW	1991, 1990, 93-94

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	0.16	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies	**Encourage:**	
	Accept:	Hikers
	Discourage:	
	Prohibit:	
	Eliminate:	Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at MP 0.00, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1470131

ROAD LOCATION: Road was located to access Unit 587.2-424. In the DEIS the road route passes through high vulnerability karst that is designated as a reserve area. The URS Karst Vulnerability Resource Report and field reconnaissance found that this area was mostly moderate vulnerability karst with two high vulnerability features and the streams that flow into them. In the FEIS, the polygon within the karst vulnerability layer of the Tuxekan Project was coded to reflect the moderate vulnerability karst verified during field layout. The karst features within this northern portion of the unit were buffered with a minimum 100-foot no-harvest buffer plus reasonable assurance of windfirmness. In the FEIS the NFS road is located beyond the 100 ft buffer plus the extra distance needed to ensure windfirmness. As a result, this distance provides more than adequate protection to the karst features. Easy construction prevails. A temporary road is planned to extend from the end of location to access landings in Unit 587.2-424. Placement of construction debris would be controlled to minimize impacts to karst.

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock to begin construction is available at an existing quarry located at MP 0.43 along the 1470100 Road. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48" structure or larger occur along this road alignment.

1.)

Station:	06+49	**Stream Class:**	IV	**Channel Type:**	MM 1		
B.F. Width:	1.5'	**B.F. Depth:**	2"	**Gradient:**	2%	**Substrate:**	Gravel
Structure:	<48" CMP						

NARRATIVE:

2.)

Station:	07+70	**Stream Class:**	IV	**Channel Type:**	MM 1		
B.F. Width:	1.5'	**B.F. Depth:**	2"	**Gradient:**	3%	**Substrate:**	Gravel
Structure:	<48" CMP						

NARRATIVE:

OTHER RESOURCE INFORMATION (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

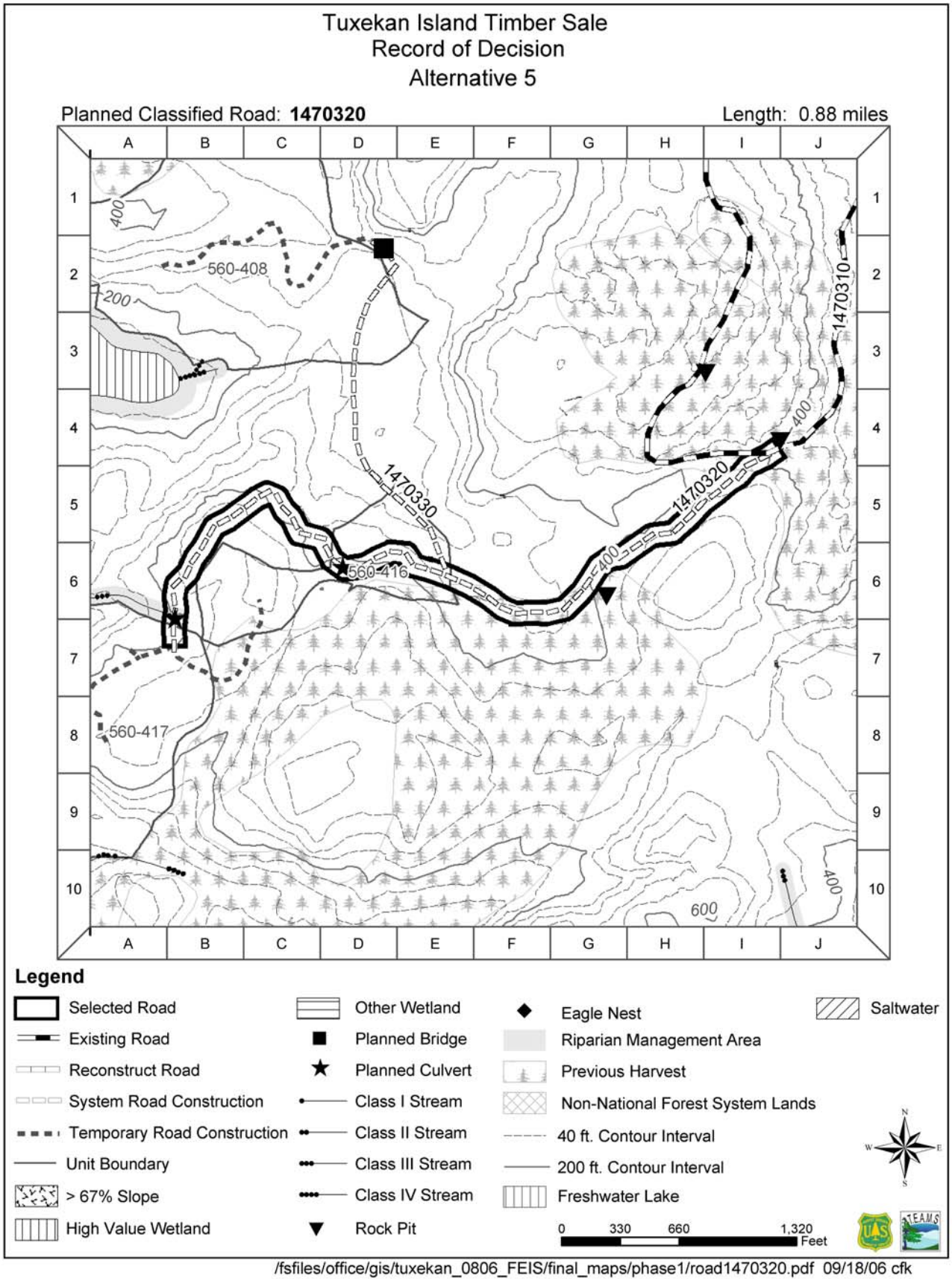
LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst areas upslope of high vulnerability karst features. For construction on or adjacent to high vulnerability karst land or features the following mitigation may be required:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP 14.18).
- Maximize use of fill type construction rather than a balanced cut and fill design
- (SGVA2, 8: BMP14.3).
- Utilize log stringer bridges or similar structures to span across collapse features if necessary (BMP14.7).
- Utilize geotextile material should be used to keep aggregate overlay from falling into the collapse feature (SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained where the road is adjacent to the significant karst feature (SGVA2, 8: BMP14.8)..
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A “plan-in-hand” review of the proposed road construction prior to actual construction is required.

Any blasting conducted would conducted only after careful design has ensured that seismic shock would not affect any fragile cave formations, destabilize cave passages or alter groundwater flow into the cave. Individual shots shall be designed to minimize overshot materials to prevent vegetation damage or destruction. Blasting plan must require before and after monitoring of the blasting site and adjacent areas to ensure that flow and vegetation have not been altered (SGVA8, BMP 14.7).

SOILS/WATER: Please see EROSION CONTROL section.

Appendix 2 – Road Cards



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1470320 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1470-320	Rock Knob		MP 0.67 Road 1470-310	MP 0.88
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.88mi.	Planned	CRAIG D-4 SW	1991, 790, 40-41

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance costs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices
0.0	0.88	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies

Encourage:
Accept: Hikers
Discourage:
Prohibit:
Eliminate: Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at junction with 1470300 and 1470310, most motorized vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1470320

ROAD LOCATION: The road was located to permit access to Units 560-417 and 560-408, while also accessing logical landing in Unit 560-416. The road location proposed in the DEIS crosses high vulnerability karst and is located too closely to significant karst features outside the unit boundary. The road location has been relocated for the FEIS to the north and west, away from the area of high vulnerability karst. The rest of the road location and unit 560-416 is comprised of moderate vulnerability karst. This relocation of the road is the preferred location for the road (Baichtal, 2005 d). Every attempt should be made to construct 1470320 using this proposed relocation (SGVA2, 3, 8). No significant karst features would be used for disposal of construction related debris (SGVA7). Temporary road requirements for karst protection are summarized on unit cards 560-408, 560-416, and 560-417.

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Limestone exposures with rock pit development potential on suitable terrain were found at stations 0+00, 4+00, 14+00, 18+00 and 30+00. Suitable rock is expected to be available at other points along the route. BMP 14.18 would be applied to pit development and rehabilitation. During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48” structure or larger occur along this road alignment.

1.) Collapsed karst feature

Station:	29+58	**Stream Class:**	NA	**Channel Type:**	NA		
B.F. Width:	NA	**B.F. Depth:**	NA	**Gradient:**	NA	**Substrate:**	NA
Structure:	18” CMP						

NARRATIVE:

2.)

Station:	44+82	**Stream Class:**	III	**Channel Type:**	HC6		
B.F. Width:	1’	**B.F. Depth:**	3”	**Gradient:**	10%	**Substrate:**	Bedrock
Structure:	18” CMP						

NARRATIVE:

<u>OTHER RESOURCE INFORMATION</u> (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst. The following mitigation measures are required on moderate vulnerability karst:

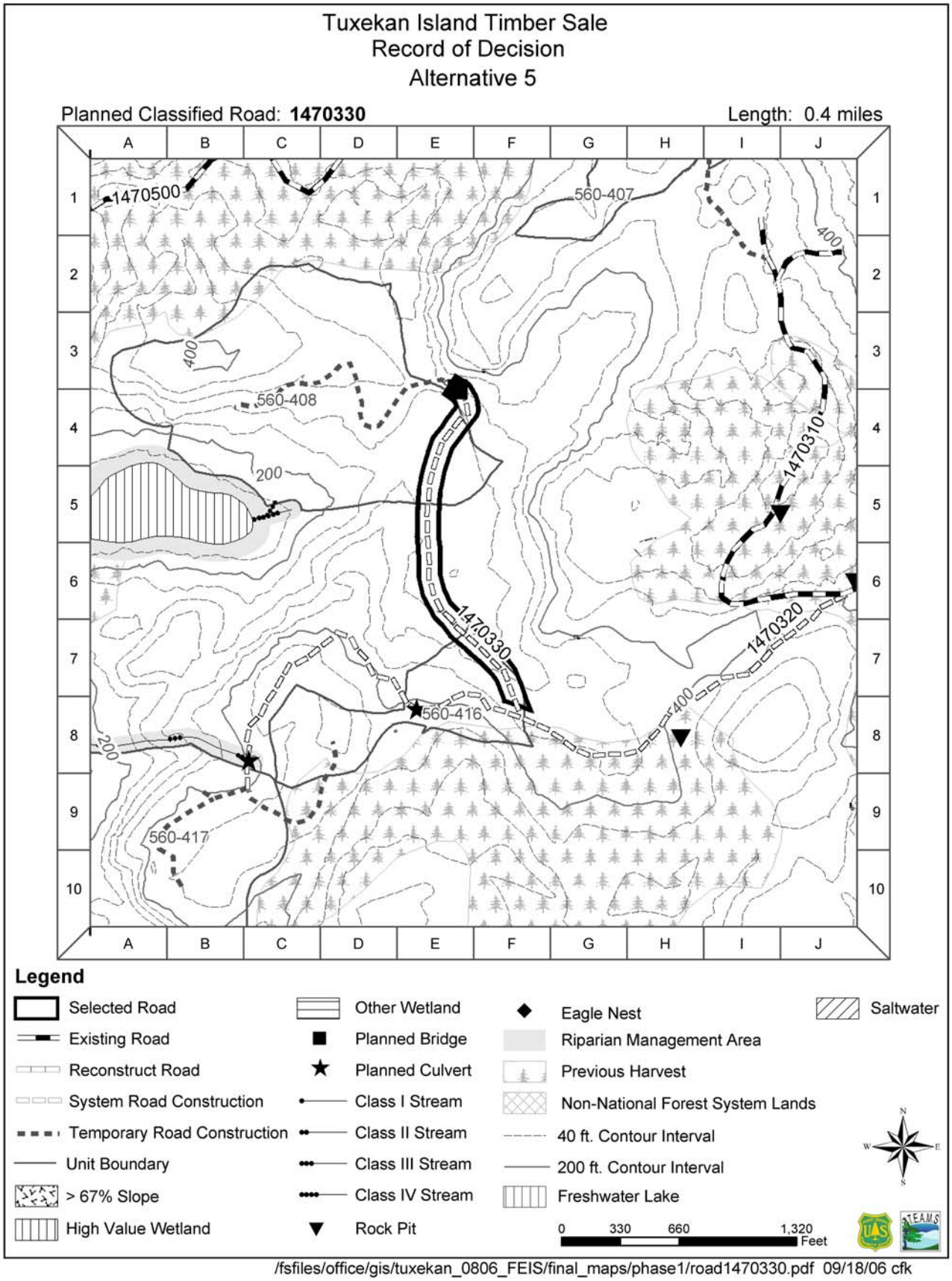
- Existing quarries and roads would be utilized in preference to the construction of new ones.
- The Forest Geologist would approve quarry locations (BMP 14.18).
- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. If road can not be rerouted the Forest Geologist and road engineer would be consulted regarding culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, 14.20).
- No quarry shall be developed atop karst without consulting with the Forest Geologist, adequate site survey and design, and obtaining their approval for the quarry (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

Following road location, additional design criteria may be required relating to road construction methods, blasting, culvert placement, sediment retention, and prevention.

For construction on or adjacent to high vulnerability karst land or features the following mitigation may be required:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8).
- Maximize use of fill type construction rather than a balanced cut and fill design (SGVA2, 8: BMP14.8).
- Utilize log stringer bridges or similar structures to span across collapse features if necessary (BMP14.7).
- Utilize geotextile material should be used to keep aggregate overlay from falling into the collapse feature (SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained as soon as ground disturbing activities begin (SGVA2, 8: BMP14.8).
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A "plan-in-hand" review of the proposed road construction prior to actual construction is required (SGVA2, 8: BMP14.8).
- Quarry development is not allowed on these lands (SGVA9).

SOILS/WATER: Please see EROSION CONTROL section.


Tuxekan Island Timber Sale
Record of Decision
Alternative 5
Planned Classified Road: 1470330
Length: 0.4 miles
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10
1470500
560-407
400
400
560-408
200
1470310
1470330
1470320
560-416
400
200
560-417
Legend
Selected Road
Existing Road
Reconstruct Road
System Road Construction
Temporary Road Construction
Unit Boundary
> 67% Slope
High Value Wetland
Other Wetland
Planned Bridge
Planned Culvert
Class I Stream
Class II Stream
Class III Stream
Class IV Stream
Rock Pit
Eagle Nest
Riparian Management Area
Previous Harvest
Non-National Forest System Lands
40 ft. Contour Interval
200 ft. Contour Interval
Freshwater Lake
Saltwater
0 330 660 1,320 Feet
N
W
E
S
/fsfiles/office/gis/tuxekan_0806_FEIS/final_maps/phase1/road1470330.pdf 09/18/06 cfk

1470330 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1470-330	Bear Flats		MP 0.39 Road 1470-320	MP 0.40
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	0.40mi.	Planned	CRAIG D-4 SW	1991, 790, 40-41

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

Access for silvicultural activities. Close road after harvest to minimize wildlife disturbance and reduce maintenance cost.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.0	0.40	2	1	D	Closed

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add water bars as needed to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies

Encourage:
Accept: Hikers
Discourage:
Prohibit:
Eliminate: Motor Vehicles

Travel Management Narrative

By removing crossing structures and constructing a barrier at junction with 1470310 and 1470300, most motor vehicle use would be eliminated. Restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1470330

ROAD LOCATION: Road was located to access Unit 560-408 and possible future units to the north and east. Currently the DEIS proposed NFS road location is adjacent to 3 high vulnerability karst features. In the FEIS, the location of the NFS road accessing the unit was shifted to lie outside the 100-foot- non-harvest buffers surrounding karst features identified during field inventory and unit layout. A log stringer bridge (LSB) will be installed to cross the karst feature on the proposed temporary road. Geotextile should be used on the bridge to keep aggregate overlay from falling into the collapsed feature (R10C5.206). Other than the discrete feature; we found the vulnerability of 560-408, and the road route, is moderate. A temporary road is planned to extend from the end of location to access Landing 3 in Unit 560-408. No significant karst features would be used for disposal of construction related debris (SGVA7).

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: Rock is available to begin construction at stations 4+00, 14+00, and 18+00 along the 1470320 Road. Rock is inferred in the ridge 100 feet west of Landing 4 in Unit 560-408 (station 15+10). During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: No fish streams or crossings requiring a 48" structure or larger occur along this road alignment.

1.) Collapsed karst feature

Station:	13+17	**Stream Class:**	NA	**Channel Type:**	NA		
B.F. Width:	NA	**B.F. Depth:**	NA	**Gradient:**	NA	**Substrate:**	NA
Structure:	LSB						

<u>OTHER RESOURCE INFORMATION</u> (if applicable)

TIMBER/LOGGING SYSTEMS: No concerns.

WILDLIFE: Road passes through high value deer habitat.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes through moderate vulnerability karst. The following mitigation measures are required on moderate vulnerability karst:

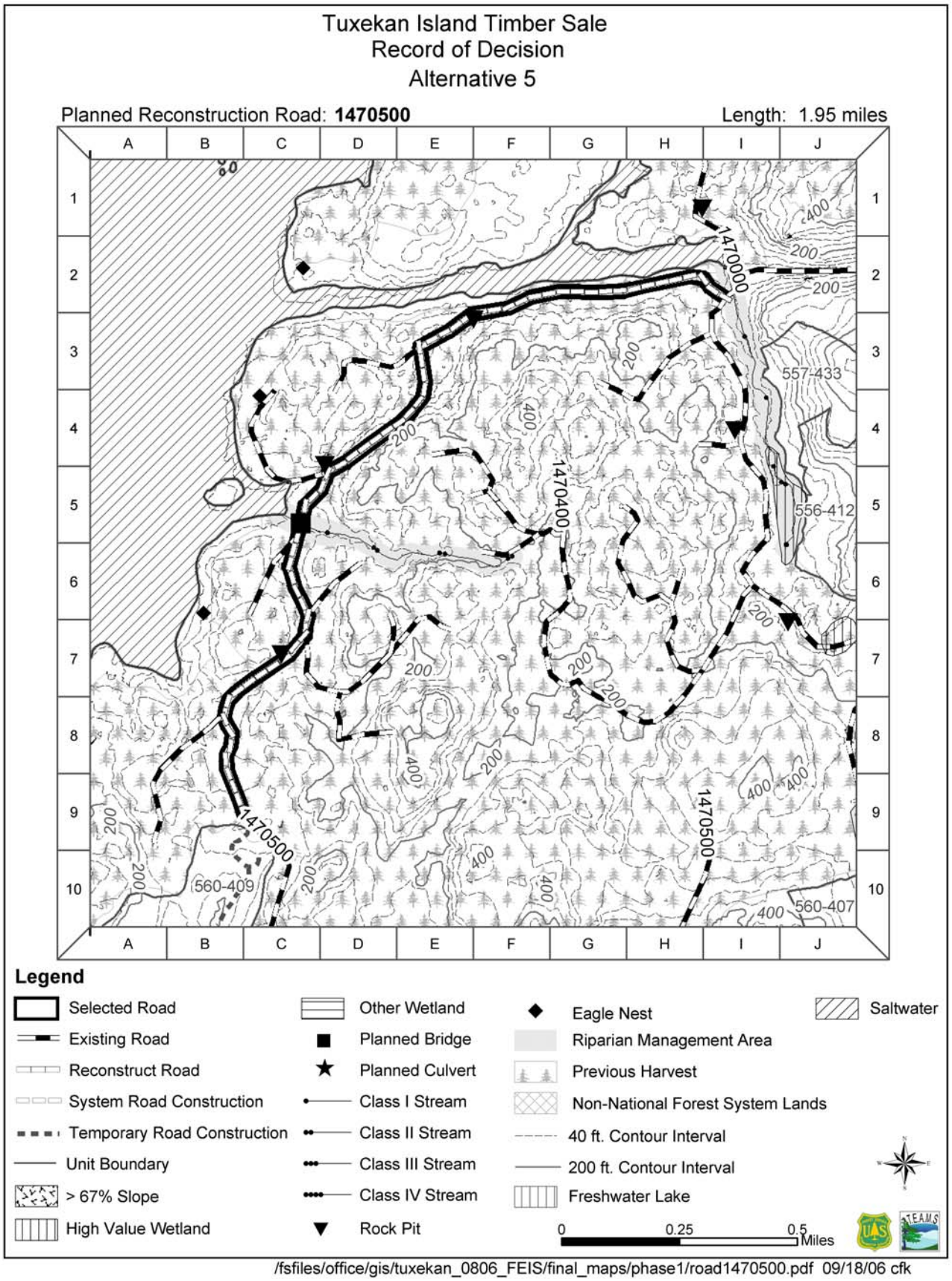
- Existing roads and quarries would be utilized in preference to the construction of new ones.
- The Forest Geologist would approve quarry locations (BMP 14.18).
- Following road relocation review the need for sediment and erosion control to ensure that additional measure are not needed. If there are any questions consult the Forest Geologist.
- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, and 14.20).
- No quarry shall be developed atop karst without consulting with the Forest Geologist and adequate site survey and design (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

Following road location, additional design criteria may be required relating to road construction methods, blasting, culvert placement, sediment retention, and prevention.

For road locations adjacent to high vulnerability karst land or features the following mitigation may be required:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8)..
- Maximize use of fill type construction rather than a balanced cut and fill design (SGVA2, 8: BMP14.8).
- Utilize log stringer bridges or similar structures to span across collapse features if necessary (BMP 14.7).
- Utilize geotextile material should be used to keep aggregate overlay from falling into the collapse feature (SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained as soon as ground disturbing activities begin (SGVA2, 8: BMP14.8).
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A "plan-in-hand" review of the proposed road construction prior to actual construction is required.
- Quarry development is not allowed on these lands (SGVA9).

SOILS/WATER: Please see EROSION CONTROL section.


Tuxekan Island Timber Sale
Record of Decision
Alternative 5
Planned Reconstruction Road: 1470500
Length: 1.95 miles
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10
1470000
1470400
1470500
557-433
556-412
560-409
560-407
200
400
Legend
Selected Road
Existing Road
Reconstruct Road
System Road Construction
Temporary Road Construction
Unit Boundary
> 67% Slope
High Value Wetland
Other Wetland
Planned Bridge
Planned Culvert
Class I Stream
Class II Stream
Class III Stream
Class IV Stream
Rock Pit
Eagle Nest
Riparian Management Area
Previous Harvest
Non-National Forest System Lands
40 ft. Contour Interval
200 ft. Contour Interval
Freshwater Lake
Saltwater
0 0.25 0.5 Miles
/fsfiles/office/gis/tuxekan_0806_FEIS/final_maps/phase1/road1470500.pdf 09/18/06 cfk

1470500 Road Management Objectives

Project			System	Land Use Designation
Tuxekan EIS			Tuxekan	TM
Route No.	**Route Name**		**Begin Terminus**	**End Terminus**
1470500			MP 5.86 1470000	MP 2.35
Begin MP	**Length**	**Status**	**Map Quarter Quad**	**Photo year, roll, photos**
0.00	1.95mi.	Existing	CRAIG D-4 SW	1991, 790, 40-42

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10	Lowboy	Logging Truck

Intended Purpose/Future Use

MP 0.00 – 1.05 Access for silvicultural activities. Depending on alternative chosen reconstruct the road from MP 0.00 to 1.95. Close road from MP 1.05 to end after harvest to minimize wildlife disturbance and reduce maintenance needs.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Traffic Service Level	Alaska Forest Practices Act
0.00	1.05	2	2	C	Inactive
1.05	1.95	2	1	D	Closed
1.95	4.10	2	1	D	Closed

Maintenance Narrative

Stormproof: MP 0.00 – 1.05 Maintain road for high clearance vehicle use.
Storage: MP 1.05 – 4.10 Remove or bypass all drainage structures to restore natural drainage patterns, add water bars to control run-off, re-vegetate exposed soil.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** USFS National Forest Ownership

Travel Management Strategies	**Encourage:**	
	Accept:	High clearance vehicles to MP 0.00 to 1.05
	Discourage:	
	Prohibit:	
	Eliminate:	Motor vehicles from MP 1.05 to end

Travel Management Narrative

MP 0.00 – 1.05 road is maintained for silvicultural access by high clearance vehicles. MP 1.05 – 4.10, by removing structures, most motor vehicle use would be eliminated, restore crossings when needed in the future.

Approved _____

District Ranger Date

Appendix 2 – Road Cards

Site Specific Design Criteria

Road 1470500

ROAD LOCATION: Existing road.

WETLANDS: Road location effectively avoids areas mapped as wetlands (BMP 12.5).

EROSION CONTROL: An erosion control plan would be developed by the contractor and subject to approval by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17). Additional BMPs to be implemented include 13.5, 14.5, 14.7, 14.8, 14.9, 14.10, 14.12, and 14.19.

ROCK PITS: During periods of high rainfall (as defined by regional specifications), blasting operations would be suspended at quarries near potentially unstable sites where ground vibrations may induce mass movement (BMP 14.6). Also during these periods, road construction that requires rock supplied from quarries shall be suspended in high risk areas on roads where rock hauling would increase the risk of mass failure (BMP 14.7).

STREAM CROSSINGS: One Class I stream crossing identified in the Road Condition Survey (RCS).

MP (RCS):	1.200	**Stream Class:**	I	**Channel Type:**	MM 1		
B.F. Width:	3.0	**B.F. Depth:**	NA	**Gradient:**	4.5	**Substrate:**	NA
Structure:	LSB						

NARRATIVE: Original structure has been removed. Recommended to replace with 50' stringer bridge that would provide for fish passage. Resurvey the crossing. May be Class I or II, however there is no flow or pooling in the dry season. With proximity to saltwater and low gradient of stream, instream timing windows would be applied of June 25 through September 1 (BMP14.6). Bridge design and installation should follow water quality management BMPs (13.16, 14.5, 14.11, 14.14, 14.15, 14.17).

RECONSTRUCTION REQUIREMENTS: Reestablish road right-of way for entire length of road. Subgrade reconstruction would be required through numerous sections along the road due to fill failure, cut bank failure, water damage, and vegetation growth. Replace missing cross drain at MP 0.95 with 18" CMP. Re-evaluate for current reconstruction requirements at time of implementation.

<u>OTHER RESOURCE INFORMATION</u> (if applicable)

TIMBER/LOGGING SYSTEMS, SILVICULTURE: No concerns.

WILDLIFE: No concerns.

VISUAL/RECREATION: No concerns.

CULTURAL: No concerns.

LANDS/MINERALS/GEOLOGY/KARST: Road passes adjacent to moderate and high vulnerability karst. However, the exact location of the road realignment and reconstruction has yet to be defined. If any high vulnerability karst is found during road layout, the Forest Geologist should be consulted prior to the road location being finalized.

The final road realignment and relocation must be approved by the Forest Geologist.

Currently, the area has been evaluated to contain moderate vulnerability karst.

The following mitigation measures are required on moderate vulnerability karst:

- Existing quarries and roads would be utilized in preference to the construction of new ones.
- Roads shall avoid sinkholes and other collapse features and loosing streams to the maximum extent possible. If road can not be rerouted the Forest Geologist and road engineer would be consulted regarding culvert installation or determination of other required mitigation (SGVA 2, 3, 4, and 8; BMP 14.17).
- Roads should not divert water to or from karst features (SGVA 4).
- Measures shall be taken to reduce erosion and sediment transport from the road surface and cutslopes (BMP's 14.9, 14.18, 14.20).
- No quarry shall be developed atop karst without consulting with the Forest Geologist, adequate site survey and design, and obtaining their approval for the quarry (SGVA 3, 8, 9 and BMP 14.18).
- Quarries shall be properly closed after use is completed (BMP 14.18).

For construction adjacent to high vulnerability karst land or features the following mitigation is required. These mitigation measures apply if the road alignment can not avoid high vulnerability karst:

- Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not deck logs pioneered from the road clearing limits outside of the clearing limits (SGVA2; BMP14.8).
- Use a fill-type construction rather than a balanced cut and fill design. These most likely would e possible since the slope gradient of these areas is generally > 15%(SGVA2, 8: BMP14.8).
- Sediment traps and erosion control measures should be installed and maintained where the road is adjacent to the significant karst feature (SGVA2, 8: BMP14.8).
- Same season revegetation of the cut and fill slopes should be required to minimize sediment production potential (SGVA2, 8: BMP14.8).
- A "plan-in-hand" review of the proposed road construction prior to actual construction is required.

SOILS/WATER: Please see EROSION CONTROL section.

Appendix 2 – Road Cards

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Appendix 4 - Non–Significant Forest Plan Amendment

Table of Contents

Appendix 4 - Non–Significant Forest Plan Amendment

Small Old-growth Habitat Reserve Adjustments in VCUs 556, 557, 560 and 587.2

Introduction

The Forest Plan established four small old growth reserves (OGRs) on Tuxekan Island. Based on project level analysis as described in the Old-growth Habitat Management Prescription and Appendix K of the Tongass National Forest Land and Resource Management Plan (1997), four small Old-growth Habitat Reserves (small OGRs) located in VCUs 556, 557, 560 and 587.2 have been adjusted based on interagency review (Old-growth Habitat Reserve Review" for Thorne Bay and Craig Ranger Districts, Tongass National Forest, May 2002) to better conform to Forest Plan standards and guidelines for location and habitat composition as part of the old-growth habitat reserve strategy (*ROD Appendix 3 – ROD Map*). Specifically:

- The small OGR for VCU 556 does not currently meet Appendix K criteria for size and includes most of the medium volume strata in the VCU but does not include high volume strata forest along the beach fringe.
- The small OGR for VCU 557 does not currently meet Appendix K criteria for size or the amount of productive old growth and is a mix of low, medium, and high volume strata forest with small inclusions of non-commercial scrub and non-forested openings.
- The small OGR for VCU 560 does not currently meet Appendix K criteria for size or the amount of productive old growth and includes only small amounts of high volume forest.
- The small OGR for VCU 587.2 does meet Appendix K criteria for size and amount of productive old growth but is linear in shape and is dominated by non-forested muskeg, non-commercial scrub forest, and low to medium volume beach fringe and riparian forest.

The interagency review concluded that boundary adjustments to the four OGRs would improve overall habitat composition of the OGRs (ROD Appendix 4). These adjustments constitute a non-significant Forest Plan amendment.

The Secretary of Agriculture's implementing regulation indicates the determination of significance for a Forest Plan amendment is to be "{b}ased on an analysis of the objectives, guidelines, and other contents of the forest plan" (36 CFR 219.10(f)). The Forest Service has issued guidance for what constitutes a "significant amendment" under the National Forest Management Act (NFMA). This guidance, in Forest Service Handbook (FSH) 1909.12, Chapter 5.32, identities four factors to be used in determining whether a proposed change to a Forest Plan is significant or not significant. These four factors are: 1) timing; 2) location and size; 3) goals, objectives, and outputs; and 4) management prescriptions. The Alaska Region issued a Supplement to FSH 1909.12, Chapter 5.32, effective October 17, 1990 that includes an additional factor that can be considered in determining the significance of a Forest Plan Amendment. This additional factor deals with technical changes. An analysis of the factors is presented below.

Timing

The timing factor takes into account when, during the life of the Forest Plan, the proposed change is to take place. Generally, the later the change in the life of the Forest Plan, the less likely it is to be significant.

The Forest Plan revision was completed in 1997, so this change is proposed nine years into the life of the Forest Plan. The Old-growth Habitat Management Prescription in the Forest Plan recognizes that the small mapped reserves have received differing levels of field review and integration of site-specific information in their design. The intent of the Forest Plan was for project level environmental analysis to evaluate the size, spacing, and habitat composition of mapped reserves, for project areas that include or are adjacent to mapped old-growth habitat reserves. Additionally, Forest Plan Appendix K gives specific instruction for how to make these changes. Clearly, modifications to the Old-growth Habitat Land Use Designation (LUD) were anticipated in the Forest Plan. For these reasons, I have determined that these proposed changes relevant to timing are not considered significant.

Location and Size

This factor takes into account the location and size of the area involved in the change, and the affected area's relationship to the overall planning area. Generally, the smaller the area affected, the less likely the change is to be significant. The interagency group reviewed the OGR mapping criteria of Appendix K. Boundaries follow streams, shorelines, watershed boundaries, and where necessary, roads and clearcut edges. The use of natural features and roads has, in some cases, resulted in inclusion of more second growth, which is likely to contribute little toward the conservation goals of the OGRs. In some cases, it also resulted in recommendations that exceeded the minimum required acreages.

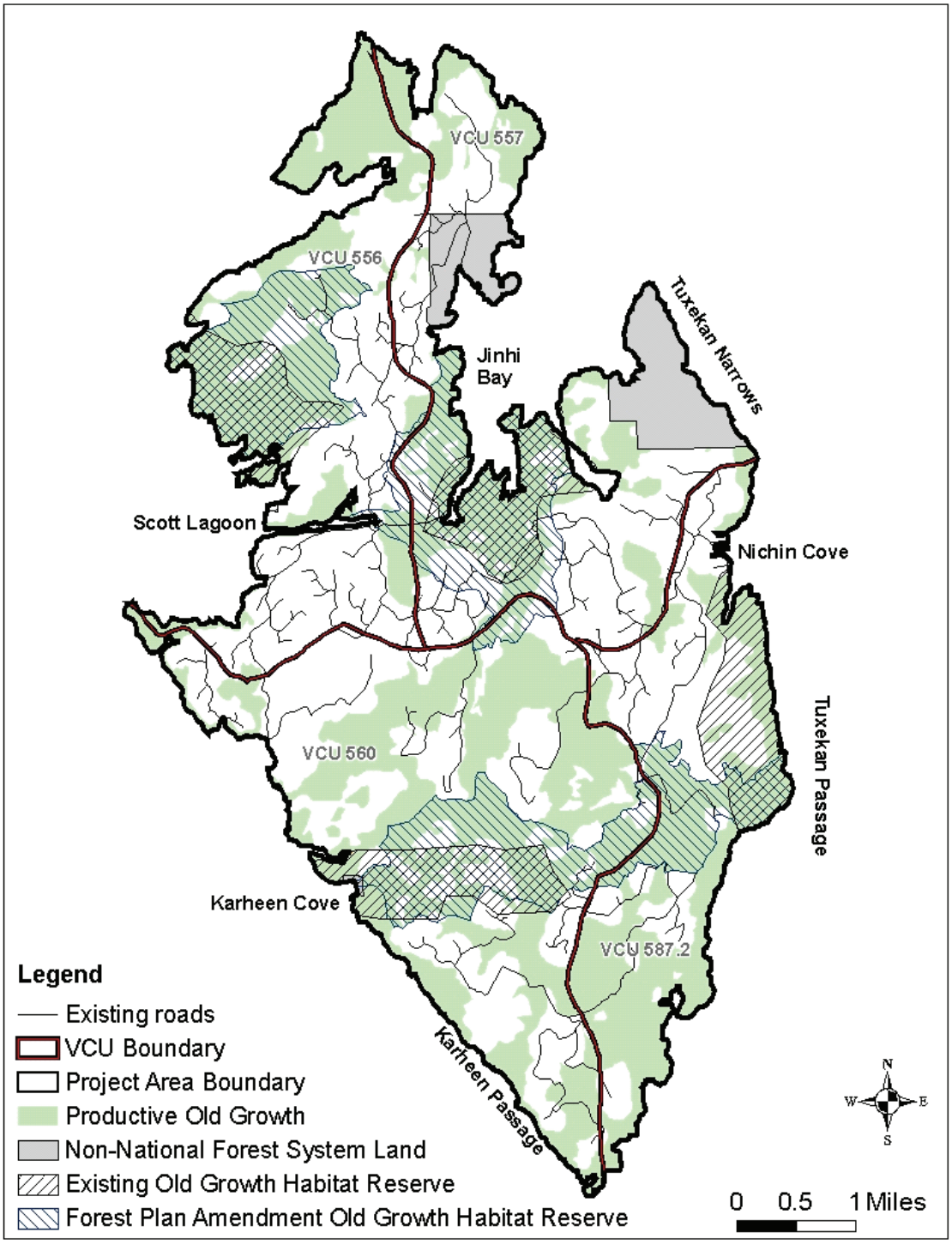


Figure 4-1. Existing and Forest Plan Amendment Old Growth Habitat Reserve for Tuxekan Island

VCU 556 Small OGR

Recommendations for this OGR are to include the largest intact stand of high-volume old growth to the north, as well as including a drainage to the south. This will result in protection of most of the high quality deer wintering habitat (almost doubles it), most of the potential goshawk and murrelet nesting habitat (11 times the existing amount of high volume timber) and most of the largest remaining block of contiguous old growth in the VCU. This is displayed in Figure 4-1.

Table 4-1. Forest Plan Appendix K Criteria for VCU 556

Appendix K criteria	Location in App K	Existing Forest Plan OGR	Interagency OGR
Total VCU acres = 5,704			
Rules Applicable to all Reserves			
Spacing should generally consider the four cardinal directions	A	Central in VCU	Central in VCU
Shape should be more circular rather than linear	B	Triangular	Square
Minimize acres of early seral habitat where feasible	C	10 acres	114 acres
Minimize amount or roads where feasible (NFS/unauthorized)	C	0/0 miles	1.6/0.8 miles
Important deer winter range (high value deer winter range)	D1	496 acres	946 acres
Known or suspected goshawk nesting habitat	D2	no	no
Known or suspected marbled murrelet nesting habitat	D3	no	no
Contains the largest block of contiguous old-growth within a watershed	D4	no	yes
Rare features, such as high volume timber stands (represented here by coarse canopy forest, volume class 6 and 7)	D5	35 acres	413 acres
Basic criteria for Allocating Reserves			
Small reserves shall be 16% of the area of a VCU (913 acres needed)	C	10% (588 acres)	20% (1,124 acres)
At least 50% of the small reserve shall be productive old growth (456 acres needed)	C	58% (531 acres)	84% (941 acres)
Specific Design Criteria for Small Reserves			
Attempt to avoid existing roads, clearcut units and log transfer facilities within small reserves	B6	See C above	
Identify contiguous blocks of old growth, including riparian, and beach and estuary buffer	B7	See C above	
Consider landscape linkages between larger reserves	C	NA, there are no medium or large reserves on Tuxekan	

The recommended design is about 536 acres larger than the existing Forest Plan design.

The changes to the OGR would reduce the Timber LUD acres in VCU 556 by 610 acres, and would reduce the acres suitable for timber harvest by 408 acres. This change is not

considered significant with respect to the size of the overall planning area within the Tongass National Forest.

VCU 557 Small OGR

Recommendations for this OGR were to expand south into VCU 560 to protect an old growth corridor to the north fork of Karheen Creek; west into VCU 556 to protect a similar corridor to Scott Lagoon; north along the west shore of Jinhi Bay to include adjacent, low elevation old growth; and southeast to include remaining forest habitat between the existing OGR and regenerating clearcuts. This configuration protects existing corridors, most of the remaining winter habitat for deer in the VCU (a 40 percent increase from the existing reserve), a known marbled murrelet nest and potential goshawk nesting habitat (doubles high volume timber stands). Approximately 196 acres are mapped in adjacent VCUs (103 acres in VCU 556 and 93 acres in VCU 560) in order to achieve old growth resource objectives. This is allowed under the Specific Design Criteria for small reserves (Appendix K, B4). This is displayed in Figure 4-1.

Table 4-2. Forest Plan Appendix K Criteria for VCU 557

Appendix K criteria	Location in App K	Existing Forest Plan OGR	Interagency OGR
Total VCU acres = 7,091			
Rules Applicable to all Reserves			
Spacing should generally consider the four cardinal directions	A	Central in VCU	Central in VCU
Shape should be more circular rather than linear	B	Oblong	U-shaped
Minimize acres of early seral habitat where feasible	C	36 acres	253 acres
Minimize amount or roads where feasible (NFS/unauthorized)	C	1.0/0 miles	1.9/0.6 miles
Important deer winter range (high value deer winter range)	D1	345 acres	577 acres
Known or suspected goshawk nesting habitat	D2	no	no
Known or suspected marbled murrelet nesting habitat	D3	no	yes
Contains the largest block of contiguous old-growth within a watershed	D4	no	yes
Rare features, such as high volume timber stands (represented here by coarse canopy forest, volume class 6 and 7)	D5	176 acres	348 acres
Basic criteria for Allocating Reserves			
Small reserves shall be 16% of the area of a VCU (1,135 acres needed)	C	8% (587 acres)	16% (1,133 acres)
At least 50% of the small reserve shall be productive old growth (576 acres needed)	C	45% (515 acres)	71% (811 acres)
Specific Design Criteria for Small Reserves			
Attempt to avoid existing roads, clearcut units and log transfer facilities within small reserves	B6	See C above	
Identify contiguous blocks of old growth, including riparian, and beach and estuary buffer	B7	See C above	
Consider landscape linkages between larger reserves	C	NA, there are no medium or large reserves on Tuxekan	

The recommended design is about 546 acres larger than the existing Forest Plan design.

The changes to the OGR would reduce the Timber LUD acres in VCU 557 by 342 acres, and would reduce the acres suitable for timber harvest by 322 acres. This change is not considered significant with respect to the size of the overall planning area within the Tongass National Forest.

VCU 560 Small OGR

Recommendations for this OGR are to expand to the north to include high volume south-facing forest stands to the north of Karheen Lakes and to the east to include a forested corridor to the low-elevation pass between the east fork of Karheen Creek and a large lake. These changes will protect high-quality habitat for wintering deer (more than doubles the amount in the existing reserve), and by including much of the largest remaining blocks of contiguous old growth within the watershed (triples high volume timber). This is displayed in Figure 4-1.

Table 4-3. Forest Plan Appendix K Criteria for VCU 560

Appendix K criteria	Location in App K	Existing Forest Plan OGR	Interagency OGR
Total VCU acres = 5,884			
Rules Applicable to all Reserves			
Spacing should generally consider the four cardinal directions	A	Located in central part of VCU	Located in central part of VCU
Shape should be more circular rather than linear	B	linear	rectangular
Minimize acres of early seral habitat where feasible	C	28 acres	69 acres
Minimize amount or roads where feasible (NFS/unauthorized)	C	0/0.1 mile	0.7/0.1 mile
Important deer winter range (high value deer winter range)	D1	264 acres	673 acres
Known or suspected goshawk nesting habitat	D2	no	no
Known or suspected marbled murrelet nesting habitat	D3	no	no
Contains the largest block of contiguous old-growth within a watershed	D4	no	Old-growth is broken up, this reserve focuses on old growth in central part of VCU
Rare features, such as high volume timber stands (represented here by coarse canopy forest, volume class 6 and 7)	D5	127 acres	444 acres
Basic criteria for Allocating Reserves			
Small reserves shall be 16% of the area of a VCU (941 acres needed)	C	11% (627 acres)	19% (1,153 acres)
At least 50% of the small reserve shall be productive old growth (470 acres needed)	C	46% (429 acres)	74% (854 acres)
Specific Design Criteria for Small Reserves			
Attempt to avoid existing roads, clearcut units and log transfer facilities within small reserves	B6	See C above	
Identify contiguous blocks of old growth, including riparian, and beach and estuary buffer	B7	See C above	
Consider landscape linkages between larger reserves	C	NA, there are no medium or large reserves on Tuxekan	

The changes to the OGR would reduce the Timber LUD acres in VCU 560 by 506 acres, and would reduce the acres suitable for timber harvest by 372 acres. This change is not considered significant with respect to the size of the overall planning area within the Tongass National Forest.

VCU 587.2 Small OGR

Recommendations for this OGR are to move to the south, extending south from the lake and stream, along the western boundary of the VCU to a series of clearcuts and roads. This would help to protect the largest remaining block of old growth habitat in the VCU, the old-growth block that provides good deer winter habitat (four times as much high-value deer winter range as existing reserve). Much of the western boundary would meet, and form a continuous reserve with the OGR in VCU 560 and greatly increases the acres of high-volume timber. This is displayed in Figure 4-1.

Table 4-4. Forest Plan Appendix K Criteria for VCU 587.2

Appendix K criteria	Location in App K	Existing Forest Plan OGR	Interagency OGR
Total VCU acres = 3,218			
Rules Applicable to all Reserves			
Spacing should generally consider the four cardinal directions	A	Located on eastern edge of VCU and island	Located in central part of VCU
Shape should be more circular rather than linear	B	linear	circular
Minimize acres of early seral habitat where feasible	C	3 acres	27 acres
Minimize amount or roads where feasible (NFS/unauthorized)	C	0.2/0.1 mile	1.6/0 miles
Important deer winter range (high value deer winter range)	D1	79 acres	342 acres
Known or suspected goshawk nesting habitat	D2	no	no
Known or suspected marbled murrelet nesting habitat	D3	no	no
Contains the largest block of contiguous old-growth within a watershed	D4	no	yes, when contiguous with reserve for 560
Rare features, such as high volume timber stands (represented here by coarse canopy forest, volume class 6 and 7)	D5	1 acres	289 acres
Basic criteria for Allocating Reserves			
Small reserves shall be 16% of the area of a VCU (515 acres needed)	C	20% (656 acres)	17% (531 acres)
At least 50% of the small reserve shall be productive old growth (400 acres needed)	C	82% (420 acres)	94% (498 acres)
Specific Design Criteria for Small Reserves			
Attempt to avoid existing roads, clearcut units and log transfer facilities within small reserves	B6	See C above	
Identify contiguous blocks of old growth, including riparian, and beach and estuary buffer	B7	See C above	
Consider landscape linkages between larger reserves	C	NA, there are no medium or large reserves on Tuxekan	

The recommended design is about 125 acres smaller than the existing Forest Plan design but still meets Plan direction for size and percent of productive old growth.

The changes to the OGR would reduce the Timber LUD acres in VCU 587.2 by 331 acres, and would reduce the acres suitable for timber harvest by 80 acres. This change is not considered significant with respect to the size of the overall planning area within the Tongass National Forest.

Goals, Objectives, and Outputs

This factor examines whether the change alters long-term relationships between the levels of goods and services projected by the Forest Plan. In most cases, changes in outputs are not likely to be a significant change in the Forest Plan unless the change would forego the opportunity to achieve an output in later years.

Goals

The Forest Plan goal for Biodiversity is to maintain healthy forest ecosystems; and, to maintain a mix of habitats at different spatial scales (i.e. site, watershed, island, province, and forest) capable of supporting the full range of naturally occurring flora, fauna, and ecological processes native to Southeast Alaska. The adjustments to these reserves are consistent with the goals of the Forest Plan.

Objectives

The Forest Plan objectives are to maintain a Forest-wide system of old-growth forest habitat (including reserves, non-development LUDs, and beach, estuary, and riparian corridors) to sustain old-growth associated species and resources; and, to ensure that the reserve system meets the minimum size, spacing, and composition criteria described in Appendix K of the Forest Plan. The adjustments to small old-growth reserves are specifically designed to meet Forest Plan Objectives.

Outputs

Adjustment of these reserves will have a relatively minor effect on the Forest Plan outputs on a Forest-wide basis, primarily because the change in the acres of LUDs that allow scheduled timber harvest is relatively small. There is a net decrease of 1,182 acres of forest lands classed as suitable for timber production within the four VCUs, which is minor when considered across the Tongass National Forest. Table A1-1 shows acres in each VCU. Suitable forest land is defined in the National Forest Management Act (NFMA) by the following criteria:

- The land is forest land capable of producing 20 cubic feet per acre per year of wood volume
- Technology is available to ensure timber production from the land without irreversible resource damage to soils productivity or watershed conditions
- There is reasonable assurance that the land can be adequately restocked
- The land is not withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service (e.g., Wilderness Areas or Resource Natural Areas)

Management Prescriptions

This factor accounts for whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning area. It evaluates how the change alters the desired future condition of the land and resources or the anticipated goods and services to be produced.

None of the standards and guidelines associated with the management prescriptions has been changed as a result of this amendment. The changes to the mapped small OGRs apply only to this specific situation. These changes also would apply in future management. However, this action does not preclude future modifications being made so long as the standards and guidelines for the management prescription are achieved. The proposed amendment fulfills the desired future condition for the Old-growth Habitat LUD Management Prescription as defined in the Forest Plan and would not significantly affect the goods and services produced.

Changes

Technical Changes

Technical changes to the management direction of a Forest Plan may be made based on new information about the actual resource characteristics of the area. These changes are not applicable to this amendment.

Cumulative Changes

The changes in acres suitable for timber harvest as specified in the Tuxekan Project Area FEIS are displayed in Table 4-5.

Table 4-5. Effects of Tuxekan Project on Acres Suitable for Timber Harvest as of May 2006

Project	Non -development to Development LUD Suitable Acres	Development to Non - development LUD Suitable Acres	Net Change in Suitable Acres
VCU 556	26	435	*-408*
VCU 557	20	342	*-322*
VCU 560	134	506	*-372*
VCU 587.2	251	331	*-80*
Tuxekan Project	**431**	**1614**	***-1182***

The Tuxekan Project Area FEIS is one of 24 National Environmental Policy Act (NEPA) decisions as of May 2006 to make non-significant amendments to the Forest Plan by modifying LUD boundaries (Table 4-6). These changes are tracked with a monitoring question posed in the Forest Plan and are part of the Annual Monitoring and Evaluation Report.

While the LUD changes within each project decision constituted non-significant Forest Plan amendments, Table 4-6 displays the cumulative effect on suitable acres for all projects. For each project, the table displays acres that were changed from a non-development LUD to a development LUD or from a development LUD to a non-development LUD and the net

change in acres suitable for timber management. The net change in suitable acres represents approximately two percent of the suitable land base (676,000 suitable acres forestwide [Forest Plan Appendix A, Table A-1-Timber Resource Land Suitability]).

Table 4-6. Effects of Tuxekan Project on Acres Suitable for Timber Harvest as of May 2006

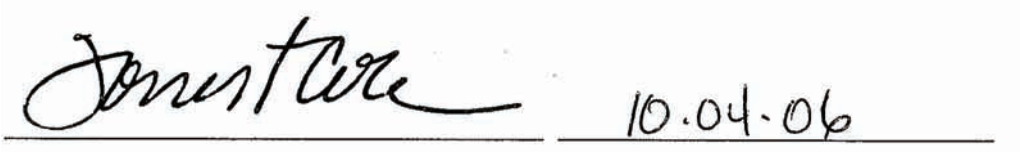
Project	Non -development to Development LUD Suitable Acres	Development to Non - development LUD Suitable Acres	Net Change in Suitable Acres
Tuxekan Project	431	1,614	*-1,183*
Goose Creek EA	2,257	1,856	+401
Overlook EA	354	578	*-224*
Scott Peak EIS	1,089	1,962	*-873*
Couverden EIS	0	153	*-153*
Kensington Gold EIS	0	1,615	*-1,615*
Madan EIS	377	1,501	*-1,124*
Finger Mountain EIS	0	593	*-593*
Cholmondoley EIS	894	6,873	*-5,979*
Woodpecker EIS	180	130	50
Polk Small Sales EA	458	826	*-368*
Threemile EIS	186	633	*-447*
Fire Cove Salvage	99	126	*-27*
Salty EA	257	794	*-537*
Luck Lake EIS	0	19	*-19*
Doughnut EIS	416	542	*-126*
Kuakan EIS	185	500	*-315*
Sea Level EIS	0	151	*-151*
Canal Hoya EIS	0	78	*-78*
Chasina EIS	446	142	304
Control Lake EIS	481	1153	*-672*
Crystal Creek EIS	177	932	*-755*
Nemo Loop EA	2	363	*-361*
Todahl Backline EA	252	0	252
Total	**8,541**	**23,134**	***-14,593***

The interagency option would fully implement the interagency committee's recommended boundary changes to all small OGRs in the project area. The interagency committee recommendations offer the best potential for protecting old-growth dependant wildlife within the framework of the old-growth strategy defined by Forest Plan (1997). The OGR modifications will bring VCUs 556, 557, 560 and 587.2 into compliance with the rules and objectives of the Forest Plan landscape-level reserve strategy. Under this option there would be a reduction of 1,182 acres of suitable timber on NFS lands on Tuxekan.

Conclusions

Based on a consideration of the factors above, I conclude adoption of this amendment is not significant in the context of the National Forest Management Act. This amendment is fully consistent with current Forest Plan goals and objectives. The amendment provides added detail on implementation of the Old-growth Habitat Management Prescriptions of the Forest Plan.

I hereby amend the Forest Plan with this non-significant amendment by adjusting VCUs 556, 557, 560 and 587.2 to comply with the rules and objectives of the Forest Plan landscape-level reserve strategy. This will result in a reduction of 1,182 acres of suitable timber on NFS lands on Tuxekan Island. The adjustments to small Old-growth Habitat Reserves are shown on Figure 4-1 and documented in the project planning record for the Tuxekan Island Timber Sale Final Environmental Impact Statement.



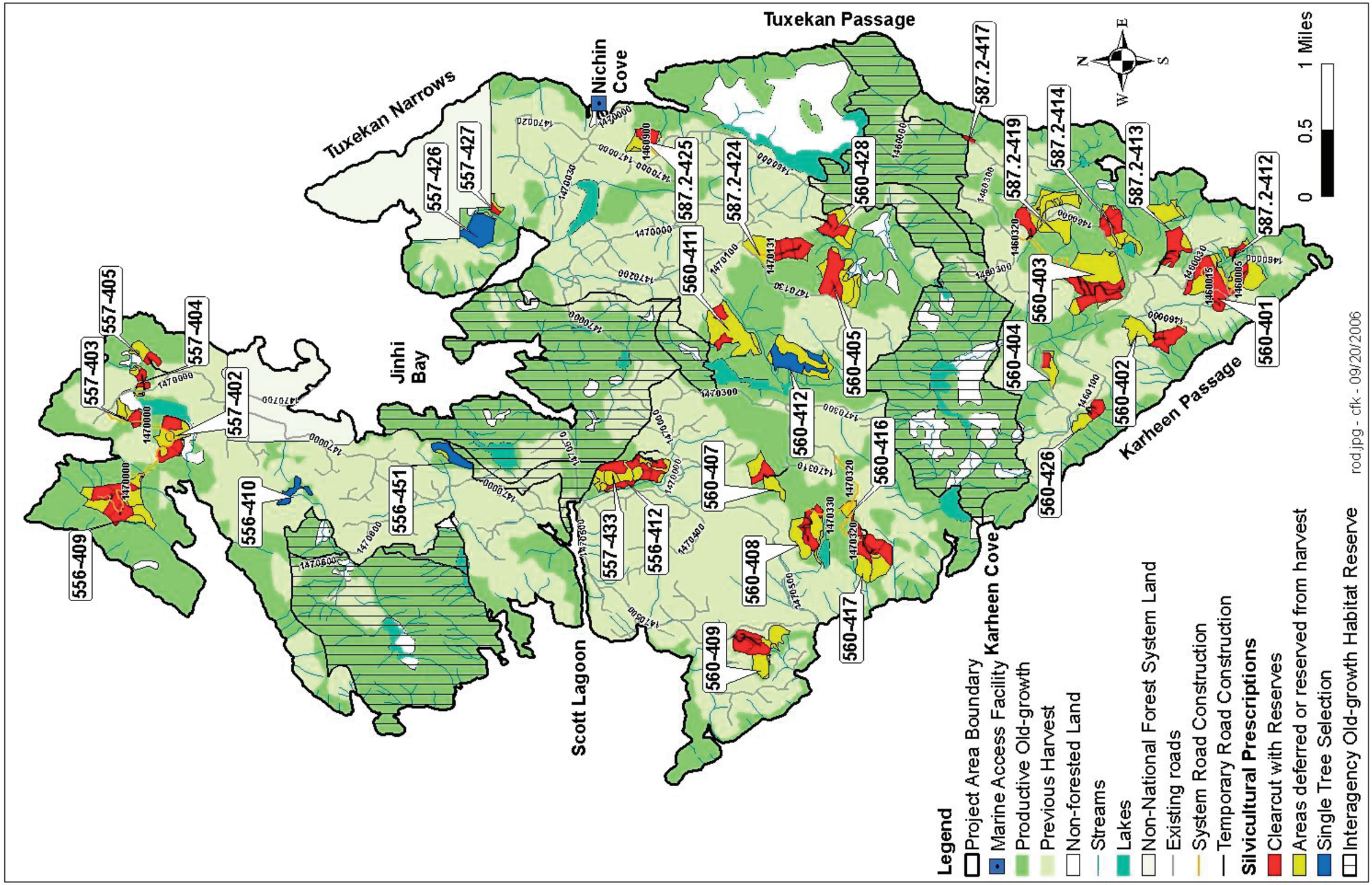
FORREST COLE
Forest Supervisor
Tongass National Forest

Date

Appendix 3 - Maps

ROD Map

ROD Access Management Plan Map


Tuxekan Passage
Tuxekan Narrows
Nichin Cove
Jinhi Bay
Scott Lagoon
Karheen Passage
Karheen Cove
557-426
557-427
557-405
557-404
557-403
557-402
556-409
556-410
556-451
557-433
556-412
560-409
560-408
560-407
560-417
560-416
560-412
560-411
560-405
560-428
587.2-425
587.2-424
587.2-417
587.2-419
587.2-414
587.2-413
587.2-412
560-403
560-404
560-402
560-401
560-426
N
E
S
W
0
0.5
1 Miles
Legend
Project Area Boundary
Marine Access Facility
Productive Old-growth
Previous Harvest
Non-forested Land
Streams
Lakes
Non-National Forest System Land
Existing roads
System Road Construction
Temporary Road Construction
Silvicultural Prescriptions
Clearcut with Reserves
Areas deferred or reserved from harvest
Single Tree Selection
Interagency Old-growth Habitat Reserve
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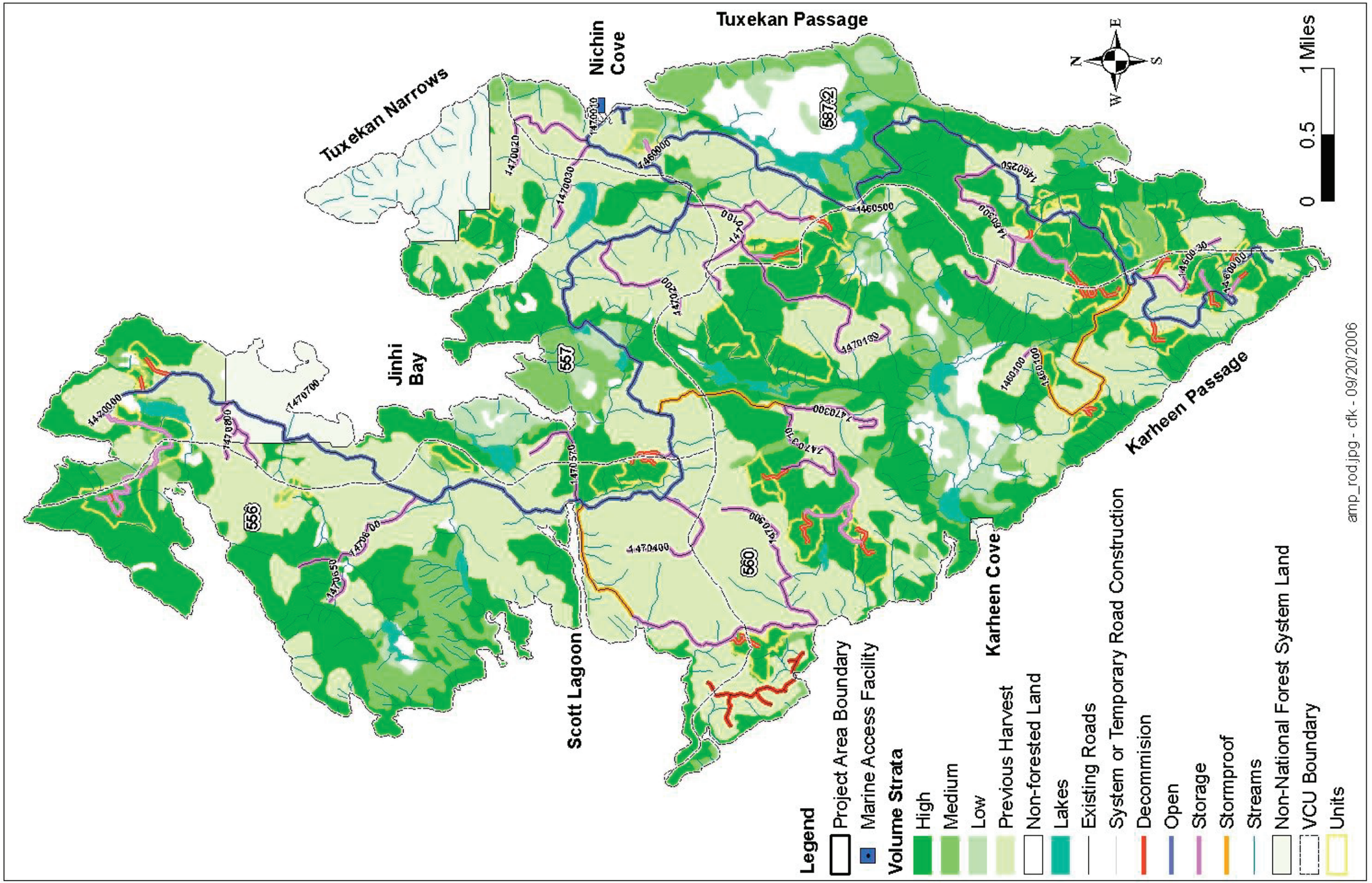
ROD map



ROD Access Management Plan map